UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

INVITATION FOR BIDS, SCHEDULES
SPECIFICATIONS, AND DRAWINGS

GATES AND HOISTS

VALE PROJECT, OREGON
YAKIMA PROJECT, WASHINGTON
(Kittitas Division)

Bids will be received at the office of the Bureau of Reclamation, Denver, Colorado, **until 3 o'**clock p. m., November 2, 1928.

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12917—28

Standard Form No. 30
Approved by the President
June 10, 1927

STANDARD GOVERNMENT FORM OF INVITATION FOR BIDS

(SUPPLY CONTRACT)

SEPTEMBER 17, 1928.

SEALED BIDS (single) will be received in this office until the date and hour named in the accompanying schedules and then publicly opened, for furnishing the materials and supplies called for therein.

Bids must be submitted upon the Standard Government Form of Bid (Standard Form No. 31) and in accordance with the Standard Government Instructions to Bidders (Standard Form No. 22) and any special instructions supplementary thereto.

Envelopes containing bids must be sealed and marked on the upper left-hand corner with the name and address of the bidder and the date and hour of opening and addressed to the purchasing agency named below:

Chief Engineer
Bureau of Reclamation
Denver, Colorado

Guaranty will be required with each bid in an amount not less than ten (10) per cent of the total price bid.

Performance bond will be required in an amount not less than fifty (50) per cent of the estimated aggregate payments to be made under the contract.

Standard Form No. 31
Approved by the President
June 10, 1927

STANDARD GOVERNMENT FORM OF BID

(SUPPLY CONTRACT)

Opening Date for this Bid

3 o'clock, p. m., November 2, 1928

To CHIEF ENGINEER,
Bureau of Reclamation,
Denver, Colorado.

PLACE ----------

DATE ----------

In compliance with your invitation for bids to furnish materials and supplies listed on the reverse hereof or on the accompanying schedules, numbered:

the undersigned,

a corporation organized and existing under the laws of the State of
a partnership consisting of

an individual trading as

of the city of
hereby proposes to furnish, within the time specified, the materials and supplies at the prices stated opposite the respective items listed on the Schedules and agrees upon receipt of written notice of the acceptance of this bid within ---------- days (60 days if no shorter period be specified) after the date of opening of the bids, to execute, if required, the Standard Government Form of Contract (Standard Form No. 32) in accordance with the bid as accepted, and to give bond, if required, with good and sufficient surety or sureties, for the faithful performance of the contract, within 10 days after the prescribed forms are presented for signature.

Discount will be allowed for prompt payment as follows: 10 calendar days ---------- per cent; 20 calendar days ---------- per cent; 30 calendar days ---------- per cent; or as stated in the schedules.

(Time will be computed from date of the delivery of the supplies to carrier when final inspection and acceptance are at point of origin, or from date of delivery at destination or port of embarkation when final inspection and acceptance are at those points, or from date correct bill or voucher properly certified by the contractor is received if the latter date is later than the date of delivery.)

(Witness to signature)

(Full name of bidder)

(Address)

NOTE.—See Standard Government Instructions to Bidders and copy of the Standard Government Form of Contract, Bid Bond, and Performance Bond, which may be obtained upon application.

To insure prompt payment bills should be certified as follows: "I certify that the above bill is correct and just and that payment therefor has not been received."

SCHEDULE NO. I

Item No.	Articles or services	Quantity	Unit	Unit price	Amount	
					Dollars	Cents
	Gates and hoists, Vale project					
1	20 by 10 foot hinged steel weir gates, with anchors, rollers, pier and wall pin bearings, seats, anchor bolts, and other appurtenant parts, complete in accordance with the attached specifications and drawings Nos. 126–D–44 and 126–D–45 ---------- The bidder agrees to deliver the materials under Item 1 f. o. b. cars at ----------, as follows: Pier pin bearings, wall pin bearings, and anchor bolts within ---------- calendar days, and the hinged steel weir gates and the balance of the materials within ---------- calendar days after receipt of written notice of acceptance of this bid. The approximate shipping weight of the materials under Item 1 will be: Pier pin bearings, wall pin bearings, and anchor bolts, ---------- ---------- pounds. Gates and other materials ---------- pounds.	7	1	------	------	----
2	Back-geared double-drum hoists, capacity 60,000 pounds, with "S"=19′—0″ and "R"=22′—0″ (see drawings Nos. 40–D–451 and 40–D–456), complete in accordance with the attached specifications and drawings Nos. 40–D–451 to 40–D–456, inclusive ---------- The bidder agrees to deliver the hoists under Item 2 f. o. b. cars at ---------- within ---------- calendar days after receipt of written notice of acceptance of this bid. The approximate shipping weight of the hoists under Item 2 will be ---------- pounds.	7	1	------	------	----

Standard Form No. 36
Approved by the President
June 10, 1927

STANDARD GOVERNMENT FORM OF CONTINUATION SCHEDULE FOR STANDARD FORM 31 OR 33

(SUPPLIES)

SCHEDULE NO. II

Item No.	Articles or services	Quantity	Unit	Unit price	Amount	
					Dollars	Cents
	Hoists for Yakima project, Kittitas division					
3	Radial gate hoists, capacity 12,000 pounds, with "S"=20'—0" and "R"=17'—2" (see drawings), complete in accordance with the attached specifications, and with list of parts and details on attached drawings Nos. 40–D–391 to 40–D–394, inclusive.....	3	1	.....	.....	.....
	The bidder agrees to deliver the hoists under Item 3 f. o. b. cars at ..... within ..... calendar days after receipt of written notice of acceptance of this bid.					
	The approximate shipping weight of the hoists under Item 3 will be ..... pounds.					
4	Radial gate hoists, capacity 7,000 pounds, complete in accordance with the attached specifications and with list of parts and details on attached drawings Nos. 40–D–447 to 40–D–450, inclusive, as follows:					
(a)	With "S"=12'—0" and "R"=14'—7" (see drawings).....	2	.....	.....	.....	.....
(b)	With "S"=13'—0" and "R"=15'—7" (see drawings).....	1	.....	.....	.....	.....
(c)	With "S"=16'—0" and "R"=15'—9" (see drawings).....	2	.....	.....	.....	.....
	Lump sum price for the five (5) radial-gate hoists under Item 4.....	Lot	.....	.....	.....	.....
	The bidder agrees to deliver the five hoists under Item 4, f. o. b. cars at ..... within ..... calendar days after receipt of written notice of acceptance of this bid.					
	The approximate shipping weight of the five hoists under Item 4 will be ..... pounds.					
5	Radial gate hoists, capacity 3,500 pounds, complete in accordance with the attached specifications and with list of parts and details on attached drawings Nos. 40–D–395 to 40–D–398 inclusive, as follows:					
(a)	With "S"=8'—0" and "R"=11'—9" (see drawing).....	1	.....	.....	.....	.....
(b)	With "S"=16'—0" and "R"=11'—9" (see drawing).....	1	.....	.....	.....	.....
	Lump-sum price for the two (2) radial gate hoists under Item 5.....	Lot	.....	.....	.....	.....
	The bidder agrees to deliver the two hoists under Item 5, f. o. b. cars at ..... within ..... calendar days after receipt of written notice of acceptance of this bid					
	The approximate shipping weight of the two hoists under Item 5 will be ..... pounds.					

Item No.	Articles or services	Quantity	Unit	Unit price	Amount	
					Dollars	Cents
	Hoists for Yakima project, Kittitas division—Continued					
6	65:1 motor-driven geared gate hoists with gate stems, with "d"=3¾" and "L"=47'-10¼" (see par. 8 of specifications and drawings for other details) with motors, limit switches and other appurtenant parts, complete in accordance with the attached specifications and with list of parts and details on attached drawings Nos. 40-D-408, 40-D-409, 40-D-410, and 40-D-407	2	1			
	The bidder agrees to deliver the hoists under Item 6, f. o. b. cars at _____ within _____ calendar days after receipt of written notice of acceptance of this bid.					
	The approximate shipping weight of the two hoists under Item 6 will be _____ pounds.					
	Combination bids					
	Combination bids for any two or more items should be given below:					
	1. Items _____ and _____ f. o. b. cars, at above delivery points for the lump sum of _____ _____ (Words) dollars, $_____.					
	2. Items _____ and _____ f. o. b. cars, at above delivery points for the lump sum of _____ _____ (Words) dollars $_____.					
	3. Items _____ and _____ f. o. b. cars, at above delivery points for the lump sum of _____ _____ (Words) dollars $_____.					
	Delivery—Urgency of.—Delivery of materials is important and is desired as follows:					
	Schedule I, Item 1. Pier-pin bearings, wall-pin bearings, and anchor bolts, 45 calendar days; gates and balance of material, 75 calendar days.					
	Schedule I, Item 2. Back-geared double-drum hoists, 100 calendar days.					
	Schedule II, Item 3. Radial gate hoists, 75 calendar days.					
	Schedule II, Item 4. Radial gate hoists, 60 calendar days.					
	Schedule II, Item 5. Radial gate hoists, 50 calendar days.					
	Schedule II, Item 6. 65:1 geared gate hoists, 75 calendar days after receipt of written notice of acceptance of bid, and all bids specifying delivery within said number of days for any item of any schedule will be considered on an equal basis as regards time of delivery for said item. Where the time of delivery specified by the bidder for any item of any schedule is greater than the number of days specified herein for said item, each day in excess thereof will be evaluated as follows:					
	Schedule I, Item 1. Pier-pin bearings, wall-pin bearings, and anchor bolts, ten dollars ($10); gates and balance of material, twenty dollars ($20).					
	Schedule I, Item 2. Twenty dollars ($20).					
	Schedule II, Item 3. Fifteen dollars ($15).					
	Schedule II, Item 4. Fifteen dollars ($15).					
	Schedule II, Item 5. Ten dollars ($10).					
	Schedule II, Item 6. Ten dollars ($10); and bids will be compared on this basis for award of contract.					

SPECIFICATIONS

GENERAL CONDITIONS

1. Performance bond.—Unless another sum is specified in the invitation for bids, the contractor shall furnish bond in an amount not less than 20 per cent of the estimated aggregate payments to be made under the contract. Bonds in amounts of $1,000 or less will be made in multiples of $100; in amounts exceeding $1,000 but not exceeding $5,000, in multiples of $500; in amounts exceeding $5,000, in multiples of $1,000: *Provided*, That the amount of the bond shall be fixed by the contracting officer at the lowest sum that fulfills all conditions of the contract.

2. Shipment.—Material or machinery furnished and delivered f. o. b. cars at factory shipping point shall be shipped on Government bills of lading furnished by the contracting officer. The contractor shall prepare all materials and articles for shipment in such manner as to protect them from damage in transit, and shall be responsible for and make good any and all damage due to improper preparation or loading for shipment. Where necessary, heavy parts or machines shall be mounted on skids or crated, and any articles or materials that might otherwise be lost shall be boxed or wired in bundles and plainly marked for identification.

3. Extras.—The contractor shall, when ordered in writing by the contracting officer, perform extra work and furnish extra material not covered by the specifications or included in the schedules, but forming an inseparable part of the work contracted for. Extra work and material will ordinarily be paid for at a lump sum or unit price agreed upon by the contractor and the contracting officer and stated in the order. Whenever, in the judgment of the contracting officer, it is impracticable, because of the nature of the work or for any other reason, to fix the price in the order, the extra work and material shall be paid for at actual necessary cost as determined by the contracting officer, plus 15 per cent for superintendence, general expense, and profit. The actual necessary cost will include all expenditures for material, labor, and supplies furnished by the contractor, and a reasonable allowance for the use of his plant and equipment, where required, to be agreed upon in writing before the work is begun, but will in no case include any allowance for office expenses, general superintendence, or other general expenses.

4. Failure of Congress to appropriate funds.—If the operations of this contract extend beyond the current fiscal year, it is understood that the contract is made contingent upon Congress making the necessary appropriation for expenditures thereunder after such current year has expired. In case such appropriation as may be necessary to carry out this contract is not made, the contractor hereby releases the Government from all liability due to the failure of Congress to make such appropriation.

5. Patents.—The contractor shall hold and save the Government, its officers, agents, servants, and employees harmless from liability of any nature or kind for or on account of the use of any patented or unpatented invention, article, or appliance furnished or used in the performance of this contract, excepting patented articles required by the Government in its specifications, the use of which the contractor does not control.

SPECIAL CONDITIONS

6. The requirement.—It is required that there be furnished and delivered f. o. b. cars at the factory shipping point, complete in accordance with these specifications and attached drawings, seven 20 by 10 foot hinged steel weir gates and seven 60,000-pound capacity back-geared double-drum hoists for the Harper diversion dam on the Vale project, Oregon; three radial gate hoists of 12,000 pounds' capacity, five radial gate hoists of 7,000 pounds' capacity, two radial gate hoists of 3,500 pounds' capacity, and two 65 : 1 motor-driven geared gate hoists, for the headworks and other structures on the Main Canal, Kittitas division, Yakima project, Washington. All gates and hoists will be installed by the Government.

7. Drawings.—The following drawings are made a part of these specifications:

Gates and Hoists for Harper Diversion Dam

20 by 10 foot hinged steel weir gate:

1. (*23481*) 126-D-44—Assembly and parts (sheet 1 of 2).
2. (*23482*) 126-D-45—Pin bearings, side seats, and anchor bolts (sheet 2 of 2).

Back-geared double-drum hoist; capacity, 60,000 pounds:

3. (*23483*) 40-D-451—Installation assembly (sheet 1 of 6).
4. (*23484*) 40-D-452—Gear housing—bearing carrier (sheet 2 of 6).
5. (*23485*) 40-D-453—Gears and list of parts (sheet 3 of 6).
6. (*23486*) 40-D-454—Bed frame and pillow block (sheet 4 of 6).
7. (*23487*) 40-D-455—Drum—bearing carrier—thrust nut (sheet 5 of 6).
8. (*23488*) 40-D-456—Gears—shafts—hoisting rope (sheet 6 of 6).

Radial gate hoist; capacity, 12,000 pounds:

9. (*23489*) 40–D–391—General assembly—list of parts (sheet 1 of 4).
10. (*23490*) 40–D–392—Gear housing—bearing carrier (sheet 2 of 4).
11. (*23491*) 40–D–393—Gears and shafts (sheet 3 of 4).
12. (*23492*) 40–D–394—Drum—drum-shaft bearing—gear guard (sheet 4 of 4).

Radial gate hoist; capacity, 7,000 pounds:

13. (*23493*) 40–D–447—General assembly—list of parts (sheet 1 of 4).
14. (*23494*) 40–D–448—Gear housing—bearing carrier (sheet 2 of 4).
15. (*23495*) 40–D–449—Gears and shafts (sheet 3 of 4).
16. (*23496*) 40–D–450—Drum—drum-shaft bearing—gear guard (sheet 4 of 4).

Radial gate hoist; capacity, 3,500 pounds:

17. (*23497*) 40–D–395—General assembly—list of parts (sheet 1 of 4).
18. (*23498*) 40–D–396—Gear housing—bearing carrier (sheet 2 of 4).
19. (*23499*) 40–D–397—Gears and shafts (sheet 3 of 4).
20. (*23500*) 40–D–398—Drum—drum-shaft bearing—gear guard (sheet 4 of 4).

65 : 1 geared gate hoist and stem:

21. (*23501*) 40–D–408—Assembly and list of parts (sheet 1 of 3).
22. (*23502*) 40–D–409—Pedestal—gear case—stem guard—lifting nut (sheet 2 of 3).
23. (*23503*) 40–D–410—Gears—shafts—studs (sheet 3 of 3).
24. (*23504*) 40–D–407—3¾ to 5 inches diameter stems—cast-iron gates.

The contractor will not be held responsible for the correctness or sufficiency of designs, but he shall carefully check the drawings and advise the contracting officer of any errors or omissions discovered by him. The contractor shall prepare, without charge to the Government, all necessary shop drawings covering the materials to be furnished under these specifications, and he shall be responsible for the correct fitting of all of the parts. Unless otherwise specifically provided in the specifications or on the drawings, the contractor shall furnish all of the materials, accessories, and appurtenant parts called for in the specifications or shown on the drawings. Anything called for on the drawings and not mentioned in the specifications, or called for in the specifications and not mentioned on the drawings, shall be furnished the same as if called for or mentioned in or on both. Such additional copies of the specifications and blue prints from original tracings as are necessary for carrying on the work will be furnished to the contractor. The bidder's attention is directed to drawings Nos. 126–D–44, "Assembly and parts," and 126–D–45, "Pin bearings, side seats, and anchor bolts," for the 20 by 10 foot hinged steel weir gate under Schedule I, item 1. Drawing No. 126–D–44 specifies the number of parts required for one gate only, and the numbers of parts should be multiplied by seven to fulfill the requirement for seven gates. Drawing No. 126–D–45 specifies the total number of parts required for seven gates, and the quantities used should be exactly as specified thereon.

8. Supplemental data not specifically shown on the drawings.—The following table covers dimensions on the drawings that are variable under different conditions of installation, and the number of ratchet wrenches required under the different items, and furnishes supplemental data that apply to the gate hoists and other parts to be furnished under these specifications:

Schedule No.	Item No.	"S"	"R"	Ratchet wrenches		Motor coupling			
				Size	No. req.	Shaft diameter	Keyway		
							Width	Depth	Length
I	2	19′ 0″	22′ 0″	1⅛″	1				
II	3	20′ 0″	17′ 2″	1⅛″	2	1 5/16″	¼″	⅛″	3½″
	4(a)	12′ 0″	14′ 7″	1⅛″	2	1 5/16″	¼″	⅛″	3½″
	4(b)	13′ 0″	15′ 7″	1⅛″	1	1 5/16″	¼″	⅛″	3½″
	4(c)	16′ 0″	15′ 9″			1 5/16″	¼″	⅛″	3½″
	5(a)	8′ 0″	11′ 9″	¾″	1	1 5/16″	3/16″	3/32″	2½″
	5(b)	16′ 0″	11′ 9″	¾″	1	1 5/16″	3/16″	3/32″	2½″
	6	Lettered dimensions are as follows: "D"=3¾″; "L"=47′ 10¼″; "L_1"=17′ 6″; "L_2"=20′ 0″; "L_3"=10′ 4″; "G"=2′ 5½″; and "T"=8′ 3″; double acme threads—½″ pitch, 1″ lead. "X"=6′ 0″.							

9. Delays—Liquidated damages.—The article, "Delays—Liquidated damages," given in paragraph 5 of the directions for preparation of contract, Standard Government Form of Contract (Standard Form No. 32), will by this reference be substituted for article 5 of the contract. This article reads as follows:

Article ____ Delays—Liquidated damages.—If the contractor refuses or fails to make delivery of the materials or supplies within the time specified in Article 1, or any extension thereof, the actual damage to the Government for the delay will be impossible to determine, and in lieu thereof the contractor shall pay to the Government, as fixed, agreed, and liquidated damages for each calendar day of delay in making delivery, the amount as set forth in the specifications or accompanying papers, and the contractor and his sureties shall be liable for the amount thereof: *Provided, however,* That the Government reserves the right to terminate the right of the contractor to proceed and to purchase similar material or supplies in the open market or secure the manufacture and delivery thereof by contract or otherwise, charging against the contractor and his sureties any excess cost occasioned the Government thereby together with liquidated damages accruing until such time as the Government may reasonably procure similar material or supplies elsewhere: *Provided further,* That the contractor shall not be charged with liquidated damages or any excess cost when the delay in delivery is due to unforeseeable causes beyond the control and without the fault or negligence of the contractor, including, but not restricted to, acts of God or the public enemy, acts of the Government, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and unusually severe weather but not including delays caused by subcontractors: *Provided further,* That the contractor shall, within ten days from the beginning of any such delay, notify the contracting officer in writing of the causes of delay, who shall ascertain the facts and extent of the delay and his findings of facts thereon shall be final and conclusive on the parties hereto, subject only to appeal, within thirty days, by the contractor to the head of the department concerned, whose decision on such appeal as to the facts of delay shall be final and conclusive on the parties hereto.

The amount of liquidated damages to be charged for failure to deliver the material under any item of either of the schedules within the time specified by the bidder will be as follows:

Schedule I, Item 1. Pier-pin bearings, wall-pin bearings, and anchor bolts, ten dollars ($10) per calendar day; gates and balance of material, twenty dollars ($20) per calendar day.

Schedule I, Item 2. Twenty dollars ($20) per calendar day.

Schedule II, Item 3. Fifteen dollars ($15) per calendar day.

Schedule II, Item 4. Fifteen dollars ($15) per calendar day.

Schedule II, Item 5. Ten dollars ($10) per calendar day.

Schedule II, Item 6. Ten dollars ($10) per calendar day.

10. Payments.—Eighty-five (85) per cent of the contract price for any item of any schedule will be paid within thirty (30) days after receipt by the Bureau of Reclamation, Denver, Colo., of proper invoices and Government bills of lading, properly receipted, covering complete shipment of the materials under said item. When all of the material under said item has been received at the railway destination, checked and accepted by the contracting officer, final payment will be made of the balance due under the contract; *Provided,* That if such acceptance is delayed beyond a period of thirty (30) days from receipt of said material at the railway destination final payment will be made of the balance due under said item at the end of said thirty (30) day period. Earlier payment may be made if a discount is allowed as provided for in Standard Government Form of Bid (Standard Form No. 31). Under a combination bid the amount to be paid under any item of any schedule will be that portion of the total amount due under the combination bid that the price bid for said item is to the sum of the prices bid for the items of the schedule, or schedules, so combined.

11. Preference for domestic articles or materials.—Preference will be given to articles or materials of domestic production, conditions of quality and price, including duty, being equal. Unless otherwise stated in the bid it will be understood that domestic articles or materials only will be used, and the use of foreign articles or materials will not be permitted unless (1) they are of better quality, or (2) being equal in quality, will be furnished at lower cost to the Government, or (3) domestic articles or materials are not available. The term "domestic articles or materials" in this connection means articles or materials manufactured or assembled in the United States or its possessions.

CONSTRUCTION

12. Patterns.—The prices bid in the schedule shall include the cost of all necessary patterns. Care shall be taken to avoid sharp corners or abrupt changes in cross section by the use of ample fillets. Patterns will remain the property of the contractor.

13. Finish for castings.—All castings shall be true to pattern, free from cracks, cold shuts, excessive shrinkage, and other injurious defects. No porosity will be allowed in positions where the strength of the casting will be impaired. All sand shall be removed before the castings are machined and painted.

14. Tolerances and machine work.—Tolerances and clearances specified on the drawings shall be closely adhered to, and the machine work shall be carefully performed, with surfaces smooth and practically free from tool marks. Where tolerances are not specified on the drawings, the contractor shall follow the best modern shop practice for apparatus of the type covered by these specifications, due consideration being given to the special nature or functions of any parts, and to the corresponding accuracy required to secure proper operation.

15. Test specimens.—The contractor shall provide, without charge to the Government, all necessary test specimens properly machined for testing, and all samples or drillings for analyses, and shall notify the contracting officer or his representative when these test specimens or samples are ready. All test specimens and samples shall be plainly marked to indicate the materials they represent and shall be properly boxed and prepared for shipment if desired.

16. Shop assembly and test.—Before shipment each gate and hoist shall be completely assembled in the shop for inspection and test. All moving parts shall move freely without binding, and if necessary the hoists shall be operated by a belt or other means until their several parts are so worn in that operation is entirely free, to the satisfaction of the contracting officer. The parts of each gate shall be marked and match-marked for identification and to facilitate assembly in the field.

17. Painting.—(*a*) *Hinged steel weir gates.*—All parts of the 20 by 10 foot hinged steel weir gates shall be thoroughly cleaned of all scale, rust, and grease, and given one shop coat of water-gas tar, except pier and wall pin bearings, pier and wall pins, and anchor bolts, which parts shall be shipped unpainted. The finished surfaces of all pier and wall pin bearings and of pier and wall pins, shall be coated with a heavy rust-preventive compound.

(*b*) *Hoists.*—The unfinished surfaces of all hoists shall be thoroughly cleaned of all rust, sand and grease and given one shop coat of first class black machinery paint. All finished surfaces shall be coated with a heavy rust-preventive compound.

18. Preparation for shipment.—All hoists shall be so prepared for shipment that the parts or groups of parts can be readily identified at the railway destination. Timber skids shall be used for mounting gear case assemblies, and other parts that can not be boxed shall be protected by burlap. All small parts shall be boxed, and properly labeled for identification to the satisfaction of the contracting officer.

19. Federal Specifications Board specifications.—Copies of the Federal Specifications Board specifications referred to herein, may be procured at a nominal cost from the Superintendent of Documents, Government Printing Office, Washington, D. C.

HINGED STEEL WEIR GATES (ITEM I)

20. Riveted joints.—The diameter and spacing of rivets and thickness of plates are shown on the drawings. Details may be slightly revised to meet the standard practice of the manufacturer, but this provision shall not be construed to permit a reduction in size and number of rivets, size of members, or thickness of plates, without the written approval of the contracting officer. It is essential that the face of the gate be water tight, and this condition shall be effected by arc welding of the joints and proper driving of rivets. Acetylene welding will not be allowed.

21. Riveting.—All riveting shall be done in accordance with first-class boiler practice. Wherever possible rivets shall be machine driven. All rivets shall be heated uniformly to a light cherry red, driven while hot, and shall completely fill the holes. The rivet heads shall be full and neatly formed, concentric with the shank, of uniform size for the same size rivets, and must thoroughly pinch the connected pieces together. Recupping and calking of rivet heads will not be allowed. Defective rivets shall be replaced. On removing rivets care shall be taken not to damage the adjacent metal, and if necessary they shall be drilled out.

22. Punching for rivets.—Holes for rivets may be punched to full size without reaming and shall be one-sixteenth inch larger in diameter than the nominal diameter of the rivet. The diameter of the die shall not exceed the diameter of the punch by more than three thirty-seconds inch. Holes must be clean cut, without torn or ragged edges. In all cases where the cold rivet can not be entered without the aid of drift pins the holes shall be reamed with a twist reamer. Drifting will not be allowed. Poor matching of holes may be cause for rejection. Punching for joints that must be water-tight shall be from the surfaces to be in contact.

23. Bevel shearing and planing.—The edges of plates that form the spliced joint in the skin plate shall be bevel sheared at an angle of 70° with the plane of the plate for calking or arc welding. The outside edges of the plates shall be accurately planed to the dimensions shown on the drawing. Bevel shearing and planing shall be done after punching. All calking shall be done with a round-nosed tool and the workmanship shall be in accordance with the best modern boiler-shop practice. The calking edge shall be drawn closely against the under plate, and neither of the plates shall be split or scored.

24. Straightening structural members.—All structural members shall be carefully straightened in the shop by methods that will prevent injury before being laid off or worked on in any way.

25. Clipping angles for clearance.—Angles shall be clipped at the end wherever there is a possibility that a square corner will interfere in any way with the proper riveting or assembling in the field.

26. Pinholes.—Pinholes shall be properly located and accurately bored to the diameters shown on the drawings. They shall be in alignment, and at right angles to the axis of the members in which they are placed.

27. Measurement of structural steel members.—Measurement of structural steel parts of all gates and particularly the over-all dimensions of assembled members shall be made when the temperature of the air about the member is at approximately 70° F. If there is any considerable variation from this temperature when measurements are made, a correction in the measured dimension shall be made, based on a coefficient of linear expansion of 0.00000636 per unit of length per degree Fahrenheit.

28. Seals.—All spring brass seals will be furnished and installed by the Government.

MATERIALS

29. General specifications for metals.—Unless otherwise specifically stated herein, all metals covered by these specifications shall be furnished in accordance with the requirements of the "United States Government General Specification for Metals," Federal Specifications Board Specification No. 339, which specification covers certain requirements which are common to all detail specifications for metals and provides means for determining whether the technical requirements of the detail specifications and drawings are being met.

30. Cast iron.—Iron castings shall be of gray iron made by the cupola process, free from injurious defects, and shall be smooth and well cleaned before inspection. They shall be commercially machinable, and shall not be plugged or welded without permission from the inspector. Such permission will be given only when the defects are small and do not adversely affect the strength, use, or machinability of the castings. In all respects not specifically mentioned herein, the castings shall conform to the "United States Government Master Specification for Gray-Iron Castings," Federal Specifications Board Specification No. 141. There shall be three classes of gray-iron castings as follows:

(*a*) *Light castings*, having a section less than one-half inch in thickness.
(*b*) *Medium castings*, falling between the two other classes.
(*c*) *Heavy castings*, having no section less than 2 inches in thickness.

The castings shall be of such a character that transverse test bars 1¼ inches in diameter and 15 inches long placed on supports 12 inches apart, will have physical properties not less than the following:

Class	Load at center	Deflection at center	Tensile strength
	Pounds	*Inches*	*Pounds per square inch*
Light castings	2,800	0.10	20,000
Medium castings	2,900	.10	21,000
Heavy castings	3,300	.10	24,000

Two sets (two bars per set) of transverse test bars shall be cast from each melt, one set from the first and the other set from the last iron going into the castings. Each set of two bars shall be cast in a single mold. Tension tests of cast iron will not be required.

31. Semisteel.—Castings shall be made by the cupola process, free from injurious defects, and shall be smooth and well cleaned before inspection. They shall be free from hard spots and shall be annealed in a furnace, if necessary, to secure satisfactory machinability. Castings shall not be plugged or welded without permission from the inspector, and such permission will be given only when the defects are small and do not adversely affect the strength, use, or machinability of the castings. In all respects not specifically mentioned herein the castings shall conform to the "United States Government Master Specification for High-Test Gray-

Iron Castings (Semisteel)", Federal Specifications Board Specification No. 140. There shall be three classes of semisteel castings, as follows:

(a) *Light castings*, having a section less than one-half inch in thickness.
(b) *Medium castings*, falling between the other two classes.
(c) *Heavy castings*, having no section less than 2 inches in thickness.

The castings shall be of such a character that transverse test bars 1¼ inches in diameter and 15 inches long, placed on supports 12 inches apart, will have physical properties not less than the following:

Class	Load at center	Deflection at center	Tensile strength
	Pounds	*Inches*	*Pounds per square inch*
Light castings	3, 500	0. 12	26, 000
Medium castings	3, 700	. 12	28, 000
Heavy castings	3, 900	. 12	30, 000

Two sets (two bars per set) of transverse test bars shall be cast from each melt, one set from the first and the other set from the last iron going into the castings. Each set of two bars shall be cast in a single mold. Tension tests will not be required.

32. Cast steel.—Steel castings shall be sound and free from injurious defects. They shall be well cleaned, with heads and gates removed for inspection in the green. When heads and gates are removed by burning, this burning shall be done at least one-half inch from the body of the casting, the remaining metal to be removed by grinding, cutting, or machining. Castings shall not be repaired, plugged, or welded without specific authority from the inspector. Such permission will be given only for welding to be completed prior to final heat treatment, and when the defects, after being thoroughly cleaned out to sound metal, are judged not to affect the strength, use, or machinability of the castings. Castings shall be annealed in a properly constructed pit or furnace, and they shall be held at the treatment temperature at least long enough for each casting to be uniformly heated throughout its mass. They shall not be removed from the furnace until they have been cooled down to a temperature of about 700° F. Rapid cooling of castings, or any further heat treatment other than reannealing, shall not be undertaken without specific authority from the contracting officer. All castings shall be annealed so that the fracture of any part shall show to the eye a fine-grain structure. They shall be well cleaned for final inspection. In all respects not specifically mentioned herein the castings shall conform to the "United States Government Master Specification for Steel Casting (Medium Grade)," Federal Specifications Board Specification No. 170. Tension-test pieces properly machined shall be furnished by the contractor in accordance with the above specification. The physical properties shall be not less than the following:

Ultimate tensile strength---------- 70,000 pounds per square inch.
Yield point---------- 45 per cent of tensile strength obtained.
Elongation in 2 inches---------- 20 per cent.
Reduction of area---------- 30 per cent.

Cold-bend tests will not be required.

33. Electric furnace cast steel.—Electric furnace cast steel shall be of a special grade having the following minimum physical properties:

Ultimate tensile strength---------- 85,000 pounds per square inch.
Yield point---------- 50,000 pounds per square inch.
Elongation in 2 inches---------- 18 per cent.
Reduction in area---------- 25 per cent.

Before machining, the castings shall be slowly heated in a properly constructed furnace or pit until a temperature of from 1,500° to 1,600° F. throughout the castings is reached. This temperature must be maintained for one-half hour. They shall then be air-cooled to a temperature of approximately 900° F., then returned to the furnace and heated to a temperature of from 1,200° to 1,250° F., which temperature must be maintained for one-half hour. They shall then be slowly cooled to a temperature of 700° F. in the furnace. The grain of the metal shall be fine and silky. Tension test pieces, properly machined, shall be furnished by the contractor for testing. Cold-bend tests will not be required. Extra precautions shall be taken in the above normalizing and annealing processes to insure that the castings will be machinable.

34. Steel and mild steel.—Steel or mild steel where specified on the drawings shall be understood to mean any good grade of low-carbon steel best suited for the purpose for which the part is to be used.

35. Cold-finished steel shafting.—Cold-finished steel shafting shall conform in all respects to the current "Standard Specifications for Commercial Bar Steels" of the American Society for Testing Materials. It shall be made of cold-finished bars, turned and polished, open-hearth grade, 20–30 carbon.

36. Forged steel.—This forging stock shall be from hot-rolled open-hearth steel forging bars of the commercial grade designated as "S. A. E.–1035 forging bars," containing from 0.30 to 0.40 carbon, machined to the dimensions shown on the drawings. The ultimate tensile strength shall be not less than 75,000 pounds per square inch.

37. Alloy steel.—The alloy steel for the hoist shafts, worms, and pinions shall be made from chrome or nickel forging stock having physical properties not less than the following:

Ultimate tensile strength	100,000 pounds per square inch.
Elastic limit	63,000 pounds per square inch.
Elongation in 2 inches	17 per cent.
Reduction of area	35 per cent.
Brinnell hardness value	166.

38. Structural shapes, plates, and rivets.—All structural shapes, plates, and rivets shall contain from 0.2 to 0.3 per cent of copper. In all other respects they shall conform to the "United States Government Master Specification for Structural Steel for Buildings," Federal Specifications Board Specification No. 352.

39. Bolt steel.—All steel rods from which bolts and studs are made shall be clean, straight, and of uniform quality and size. The physical properties of the steel from which bolts and studs are made shall be not less than the following:

Material	Ultimate tensile strength	Yield point	Elongation in 8 inches
Bolt steel:	*Pounds per square inch*	*Pounds per square inch*	*Per cent*
Class "A"	75, 000	40, 000	23
Class "B"	58, 000	30, 000	28
Class "C"	Commercial grade.	----------	----------

All threads shall be National Form, coarse. See "United States Government Master Specification for Bolts, Nuts, and Machine Screws," Federal Specifications Board Specification No. 548.

40. Finish for bolts, studs, and nuts.—Bolts, studs, and nuts will be of two classes—semifinished and finished, as follows:

(*a*) Semifinished bolts and nuts shall be die chamfered, machined under head and nut, threaded, with the head of the bolt concentric with the body, and the faced side at right angles to the body.

(*b*) Finished bolts, studs, and nuts shall be machined throughout, threaded, with head chamfered, concentric with and at right angles to the body of the bolt.

41. Wire rope.—All wire rope shall be plow-steel grade, galvanized, of the types, sizes, and length specified on the drawings. The properties of the rope shall be as follows:

Size	Type	Minimum breaking strength	Maximum safe working load
		Pounds	*Pounds*
1/4 inch	6 by 19	15, 600	3, 460
5/8 inch	6 by 19	31, 800	7, 060
3/4 inch	6 by 19	46, 000	10, 200
3/8 by 6 inches	Flat	190, 000	34, 000

All round wire rope shall have 6 strands of 19 wires each, and shall conform to the requirements for Type M high-grade plow steel rope in "United States Government Master Specification for Wire Rope," Federal Specifications Board Specification No. 297. The 3/8 by 6 inch flat rope shall be similar and equal to that type and size manufactured by the American Steel & Wire Co. All sockets shall be drop-forged weldless steel, and all thimbles shall be of the oval type, galvanized. All sockets shall be connected to ropes with molten zinc at a temperature not to exceed 800° F., and special care shall be taken in thus connecting the 3/8 by 6 inch flat ropes to the drums to insure that the rope will wind on the drums truly and without twists or strains. Splices shall be carefully made by experienced men.

42. Bronze castings.—Bronze castings shall be made only from the best grades of virgin metals. The use of scrap metal will not be allowed. They shall be of uniform quality, free from blowholes, porosity, hard spots, shrinkage defects, cracks, or other injurious defects, and shall be smooth and well cleaned before inspection. Castings shall not be repaired, plugged, or welded without permission from the inspector. Such permission will be given only when the defects are small and do not adversely affect the strength, use, or machinability of the castings.

43. Bronze.—Where "bronze" only is specified on the drawings, except for nuts, the castings may be made of either grade No. 5 or grade No. 6 bronze. In all respects not specifically mentioned herein bronze castings shall conform to the "United States Government Master Specification for Bronze Castings," Federal Specifications Board Specification No. 172a. The physical properties of the bronze castings shall be not less than the following:

Grade	Ultimate tensile strength	Yield point (tensile strength)	Elongation in 2 inches
	Pounds per square inch	*Pounds per square inch*	*Per cent*
5	40,000	0.5	20
6	35,000	.5	18

Chemical analysis shall show:

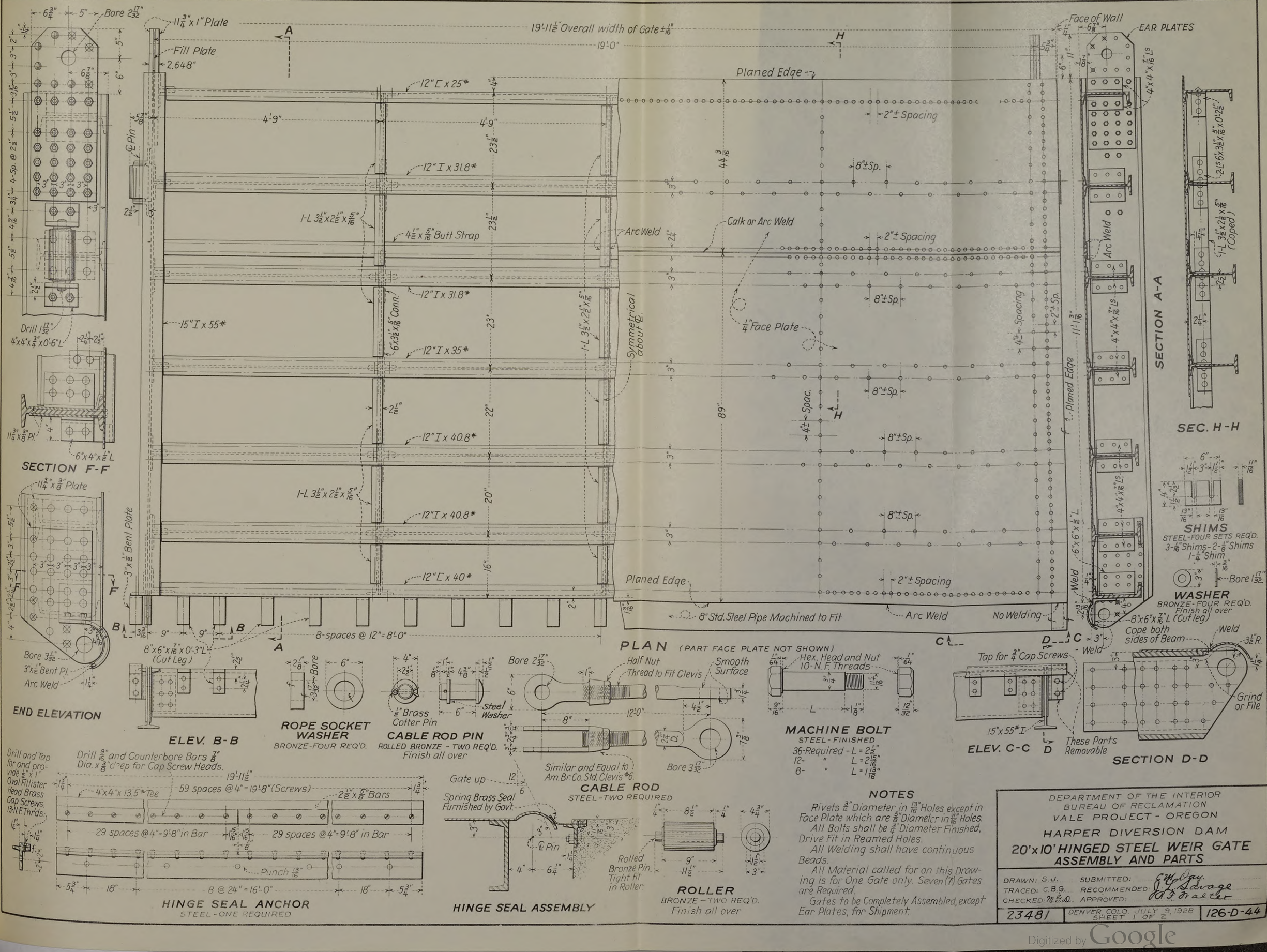
Elements	Composition	Grade 5	Grade 6
		Per cent	*Per cent*
Copper	Desired	88	88
	Permissible	86–89	85–89
Tin	Desired	8	8
	Permissible	7.5–11	7.5–11
Zinc	Desired	4	4
	Permissible	1.5–4.5	1.5–4.5
Lead	Desired	0	0
	Permissible	0–0.3	0–1.0
Iron	Desired, maximum	0	0
	Permissible, maximum	0.1	0.25
Nickel	Desired, maximum		
	Permissible, maximum	0.75	0.75
Phosphorus	Desired, maximum	0	0
	Permissible, maximum	0.05	0.50
Sulphur	Desired, maximum	0	0
	Permissible, maximum	0.05	0.05
Antimony	Desired, maximum	0	0
	Permissible, maximum	0.25	0.25
Other elements	Desired, maximum	0	0
	Permissible, maximum	0.15	0.35

44. Rolled bronze.—The physical properties of rolled bronze shall be not less than the following:

Ultimate tensile strength—60,000 pounds per square inch.
Yield point—30,000 pounds per square inch.
Elongation in 2 inches—30 per cent.

45. Electrical equipment.—Limit switches of the type and size specified on the drawings shall be included with all hoists. Motors for operating the 65:1 geared gate hoists under Schedule II, Item 6, shall be of the type, capacity, and characteristics specified on drawing No. 40–D–408. The motors shall be properly mounted and aligned before shipment, and shall be used for making the shop test of the hoists as specified in paragraph 16.

U. S. GOVERNMENT PRINTING OFFICE: 1928



NOTES

Rivets ¾" Diameter in 13/16" Holes except in Face Plate which are 5/8" Diameter in 11/16" Holes.

All Bolts shall be ¾" Diameter Finished, Drive Fit in Reamed Holes.

All Welding shall have continuous Beads.

All Material called for on this Drawing is for One Gate only. Seven (7) Gates are Required.

Gates to be Completely Assembled, except Ear Plates, for Shipment.

DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
VALE PROJECT - OREGON

HARPER DIVERSION DAM

20' x 10' HINGED STEEL WEIR GATE ASSEMBLY AND PARTS

DRAWN: S.J.	SUBMITTED:	J.W. Day
TRACED: C.B.G.	RECOMMENDED:	J.L. Savage
CHECKED: M.E.D.	APPROVED:	J.L. Walter

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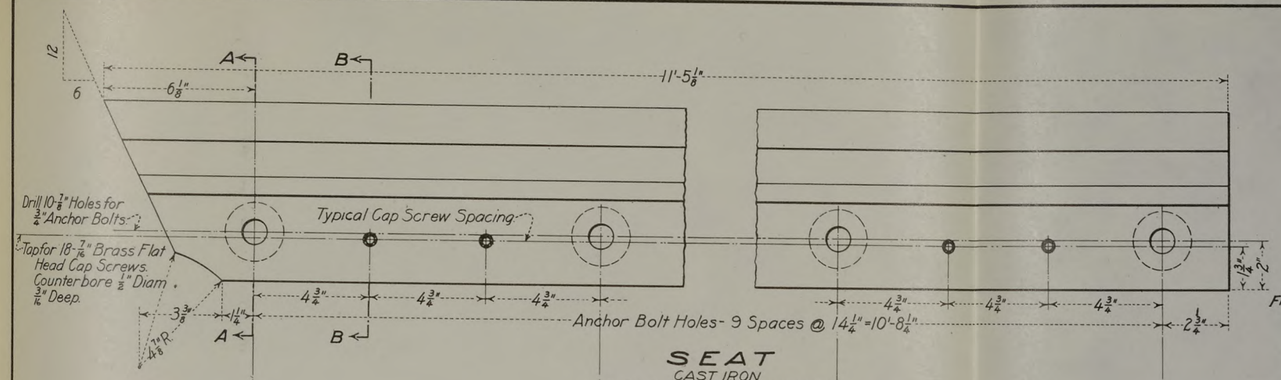
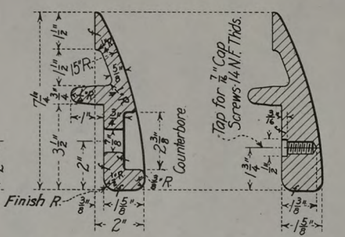
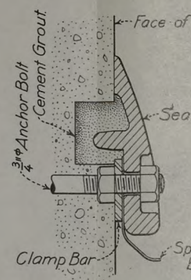


SEAT
CAST IRON
7 REQUIRED AS SHOWN
7 " OPPOSITE HAND

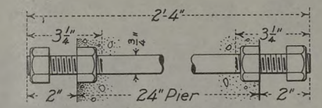


SECTION A-A

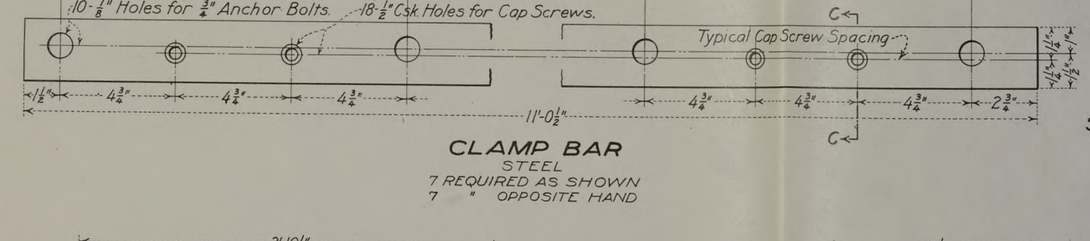
SECTION B-B



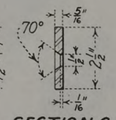
ASSEMBLY



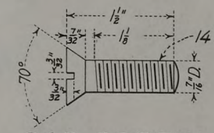
ANCHOR BOLT
(GATE SEAT)
60 REQUIRED
STEEL



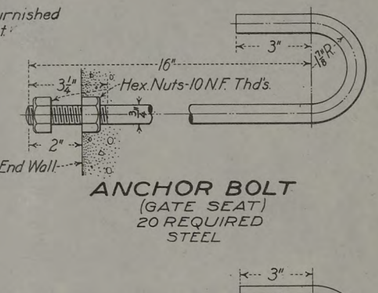
CLAMP BAR
STEEL
7 REQUIRED AS SHOWN
7 " OPPOSITE HAND



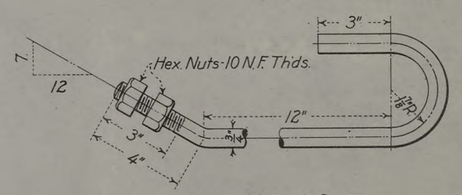
SECTION C-C



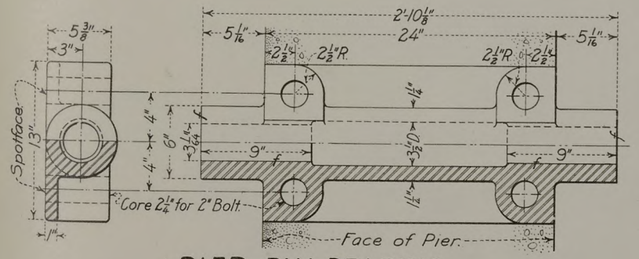
CAP SCREW
BRASS
265 REQUIRED



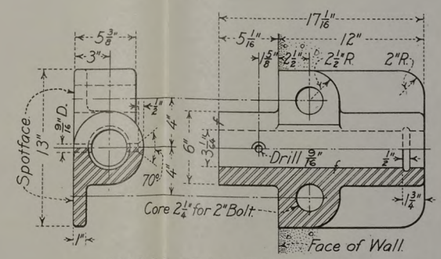
ANCHOR BOLT
(GATE SEAT)
20 REQUIRED
STEEL



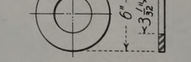
ANCHOR BOLT
(HINGE SEAL ANCHOR)
77 REQUIRED
STEEL



PIER PIN BEARING
CAST STEEL
6 REQUIRED

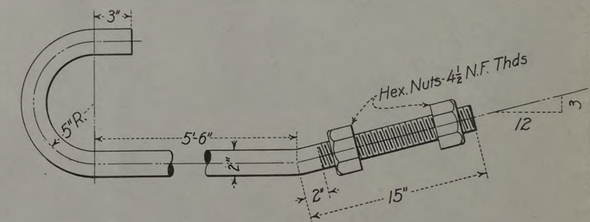


WALL PIN BEARING
CAST STEEL
2 REQUIRED

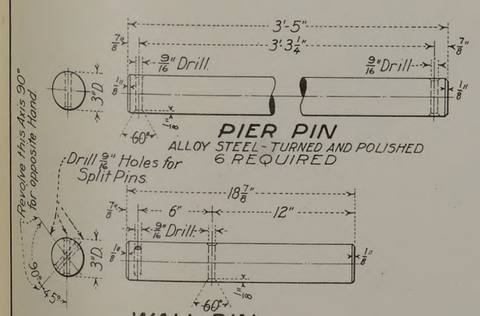


PIN WASHER
STEEL
18 REQUIRED

Note: All nuts cold punched, chamfered and trimmed commercial grades

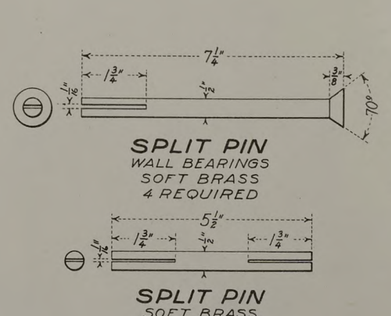


ANCHOR BOLT
(PIN BEARING)
28 REQUIRED
STEEL



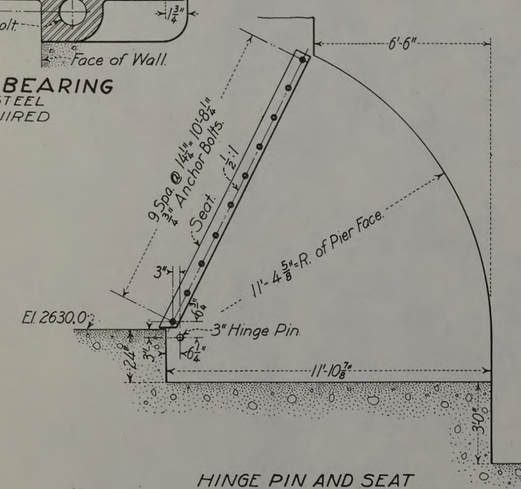
PIER PIN
ALLOY STEEL-TURNED AND POLISHED
6 REQUIRED

WALL PIN
ALLOY STEEL-TURNED AND POLISHED
ONE REQUIRED AS SHOWN
ONE REQUIRED-OPPOSITE HAND AS NOTED

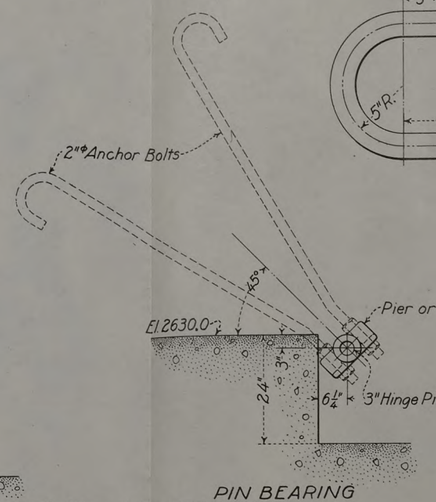


SPLIT PIN
WALL BEARINGS
SOFT BRASS
4 REQUIRED

SPLIT PIN
SOFT BRASS
18 REQUIRED



HINGE PIN AND SEAT



PIN BEARING

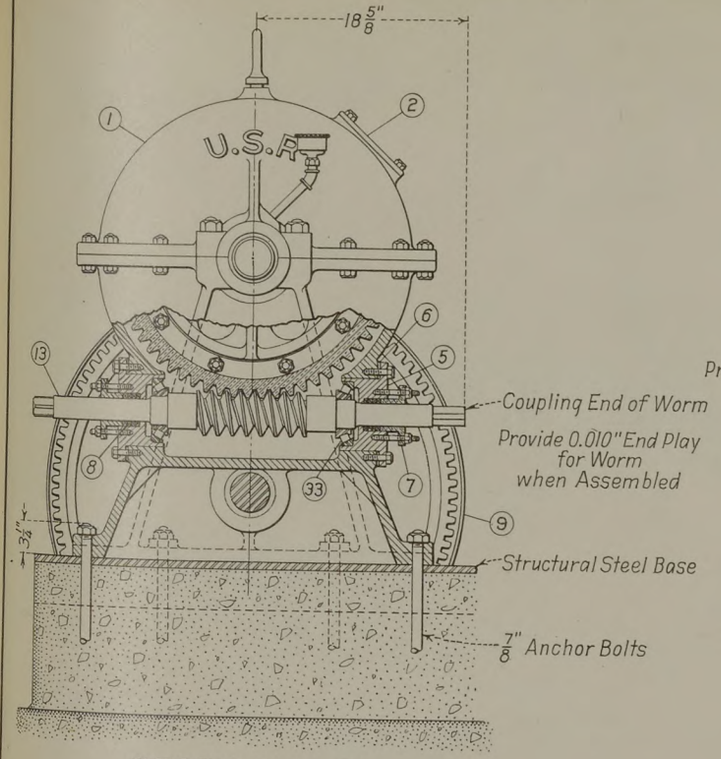
INSTALLATION ASSEMBLY

Quantities Specified on this Drawing cover the Material required for 7 Gates.

DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
VALE PROJECT-OREGON

HARPER DIVERSION DAM
20'x 10' HINGED STEEL WEIR GATE
PIN BEARINGS, SIDE SEATS AND ANCHOR BOLTS

DRAWN M.G.D.	SUBMITTED	E.M. Day	
TRACED C.A.M.	RECOMMENDED	O.L. Babcock	
CHECKED F.B.H.	APPROVED	A.P. Parker	
23482	DENVER, COLO. JULY 11, 1928 SHEET 2 OF 2		126-D-45



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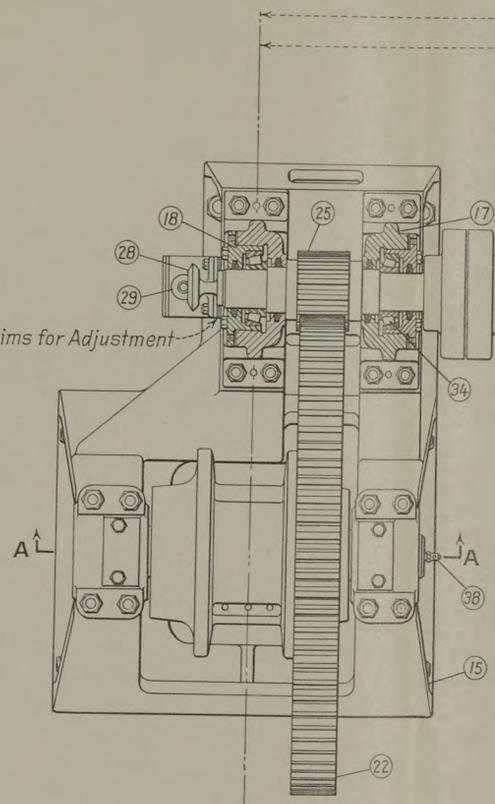
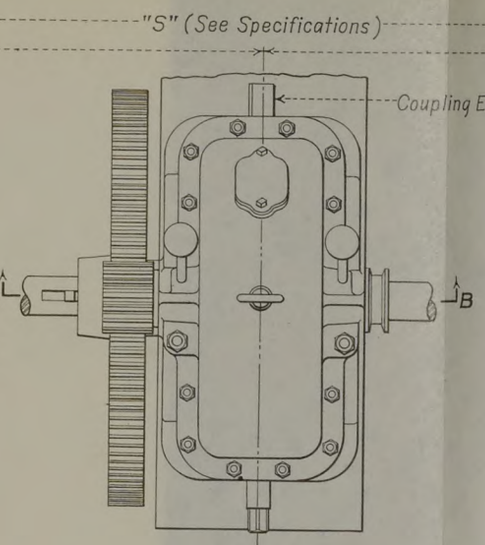
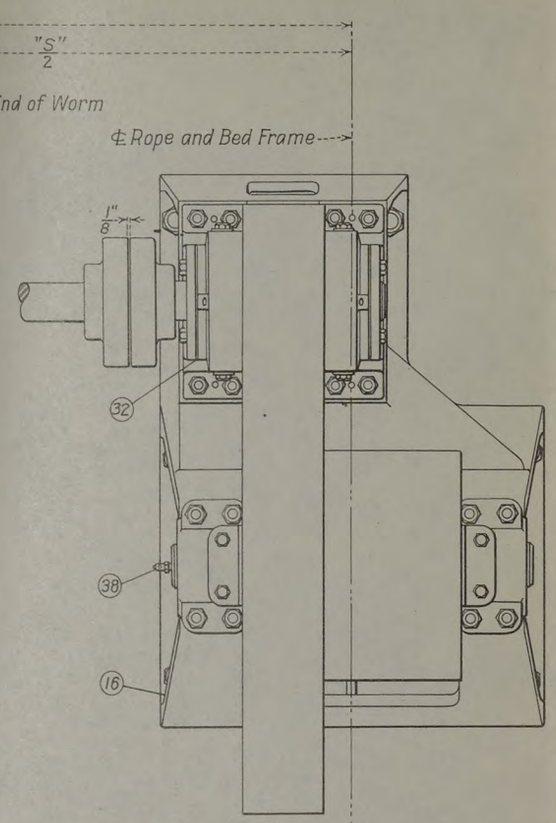
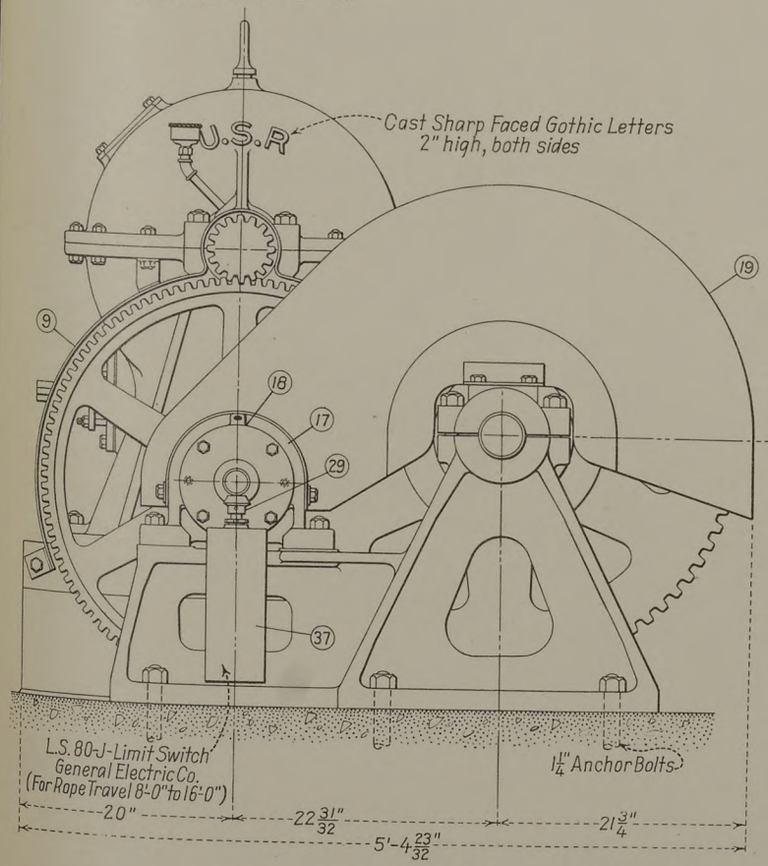


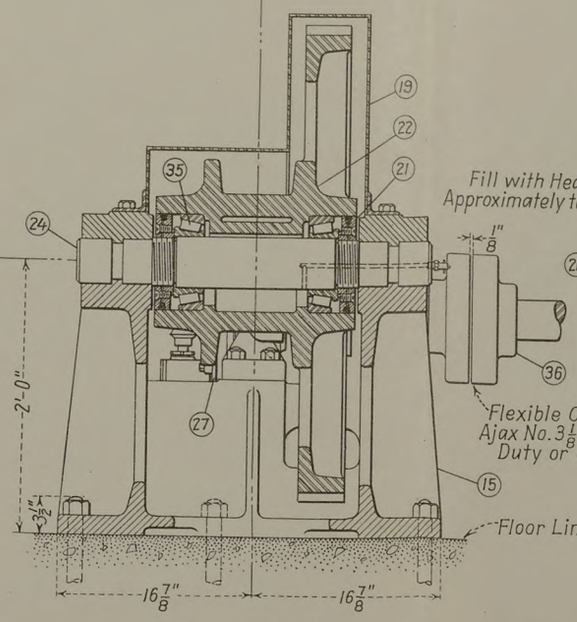


PLAN





SIDE ELEVATION



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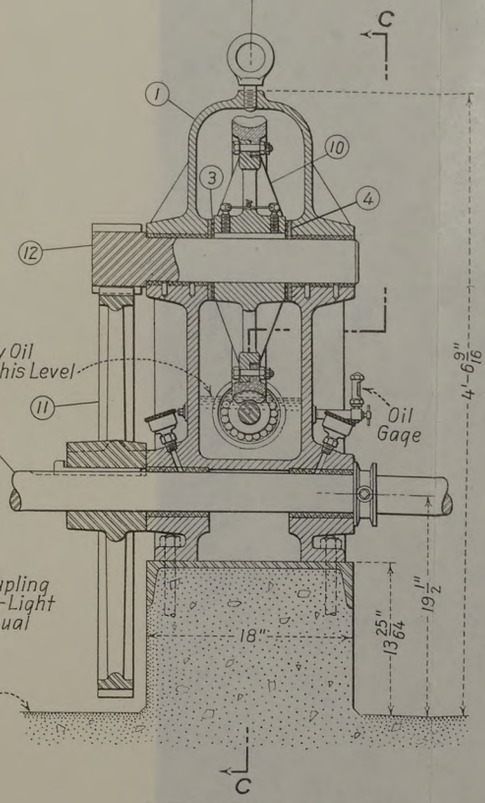

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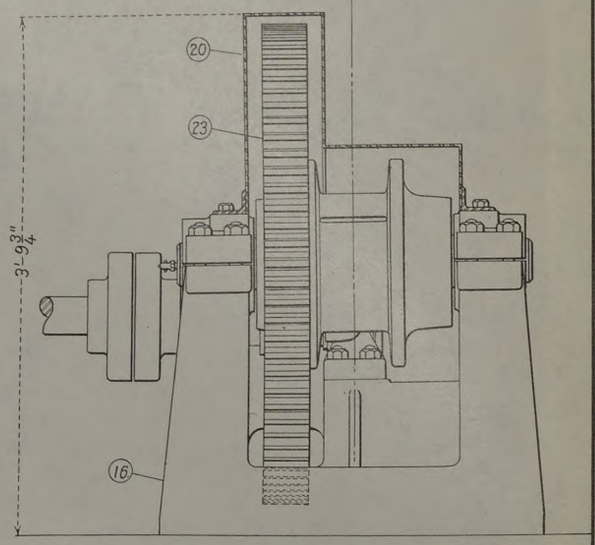


NOTES

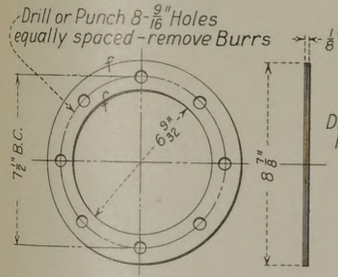
Anchor Bolts and Structural Steel Base for Hoist to be furnished by the Government.
Casting Dimensions are Minimum, add required Draft.

DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
DENVER OFFICE

BACK GEARED DOUBLE DRUM HOIST INSTALLATION ASSEMBLY

CAPACITY 60,000 POUNDS

DRAWN: B.H.S.	SUBMITTED: C. M. Dey	
TRACED: A-A-A	RECOMMENDED: J. L. Savage	
CHECKED: E.B.H. M.G.D.	APPROVED: A. D. Walter	
23483	DENVER COLO., JULY 26, 1928 SHEET 1 OF 6	40-D-451

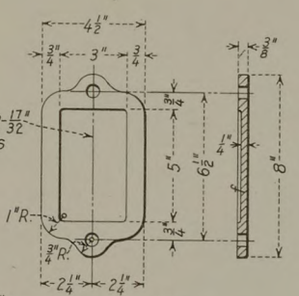


(6)

7 Sheets @.005"
9 Sheets @.010

SHIM

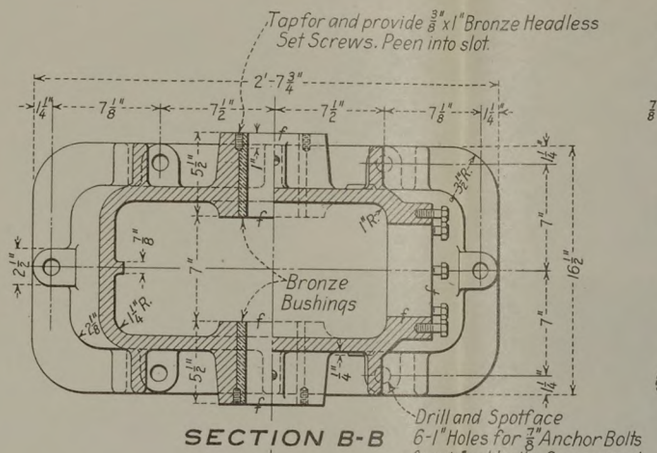
SHEET STEEL - ONE REQUIRED



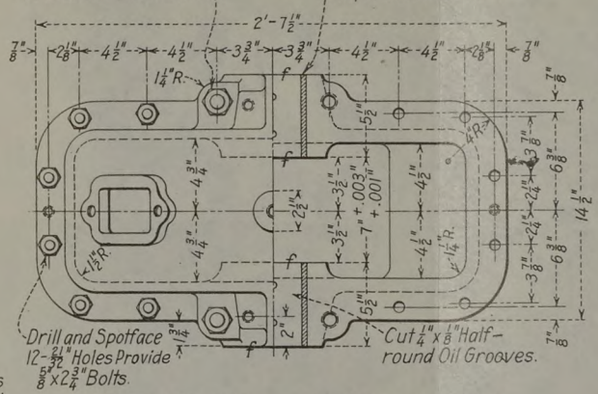
(2)

COVER PLATE

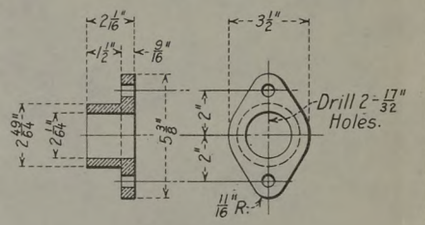
SEMISTEEL - ONE REQUIRED



SECTION B-B



HALF PLAN



(7)

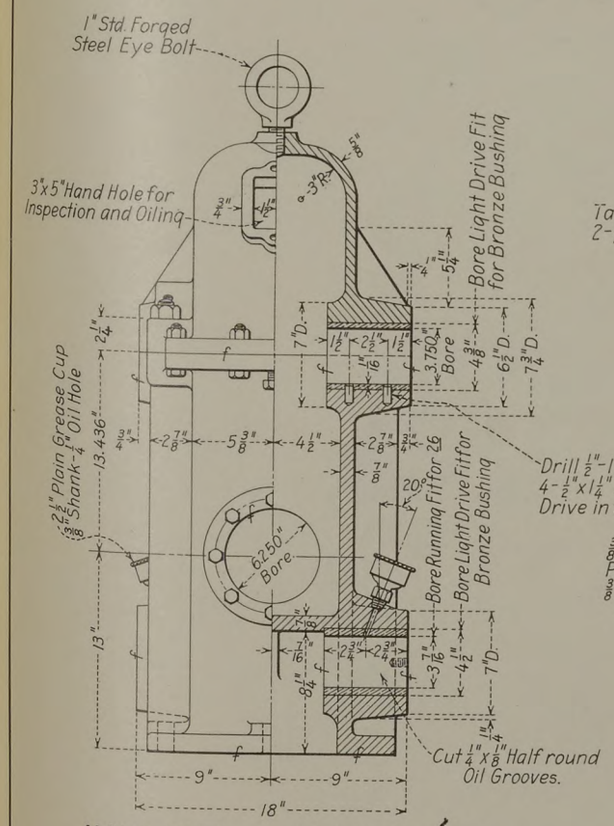
GLAND

BRONZE - TWO REQUIRED

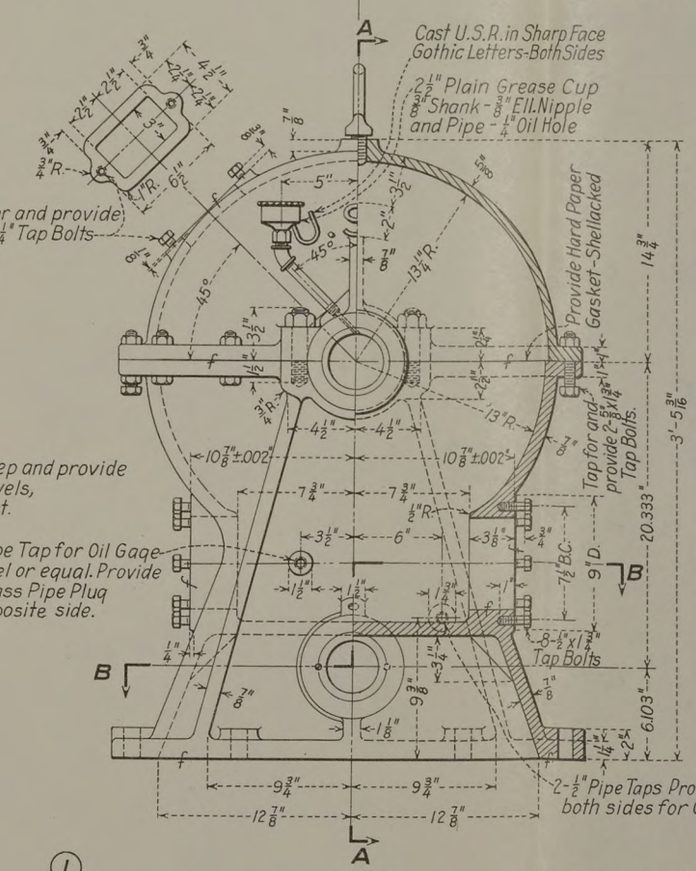
Finish all over

HALF PLAN

(TOP OF HOUSING REMOVED)



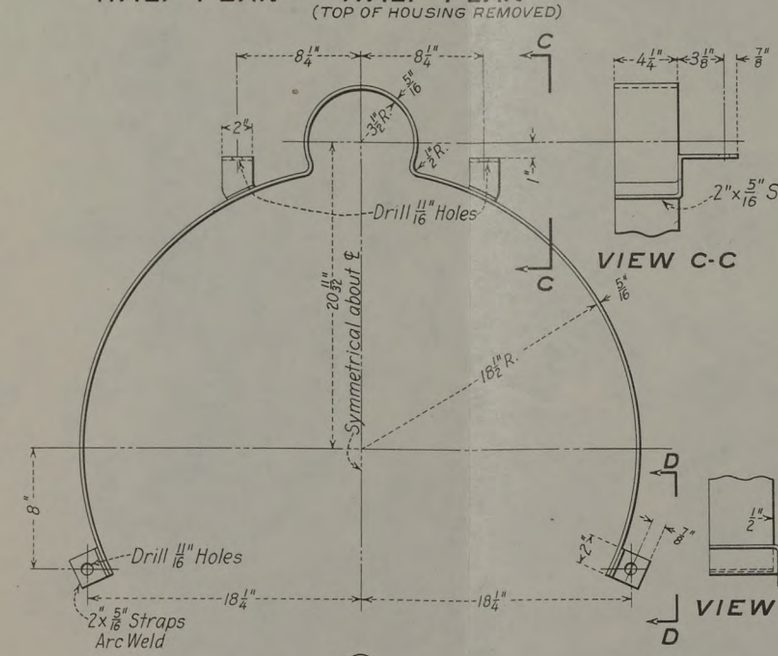
HALF ELEV. **HALF SEC. A-A**



(1)

GEAR HOUSING

SEMISTEEL - TWO REQUIRED



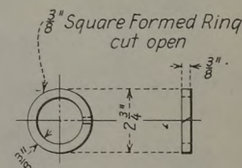
VIEW C-C

VIEW D-D

(9)

GEAR GUARD

MILD STEEL - ONE REQUIRED

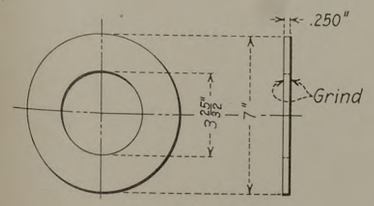


(8)

PACKING

GARLOCK NO. 99 OR EQUAL

EIGHT RINGS REQUIRED

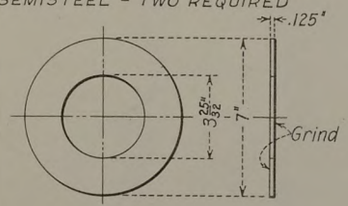


(4)

THRUST WASHER

BRONZE - TWO REQUIRED

Finish all over

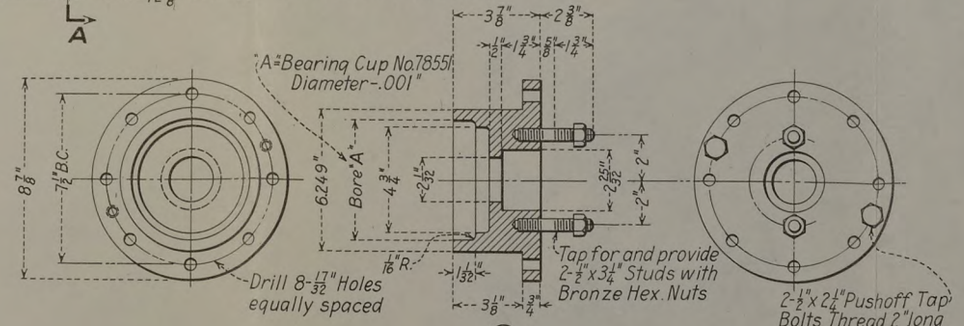


(3)

THRUST WASHER

STEEL - TWO REQUIRED

Finish all over



(5)

BEARING CARRIER

SEMISTEEL - TWO REQUIRED

Finish all over

DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
DENVER OFFICE

BACK GEARED DOUBLE DRUM HOIST

GEAR HOUSING - BEARING CARRIER

CAPACITY 60,000 POUNDS

DRAWN: B.H.S. SUBMITTED: G. M. Day
TRACED: J.E.V. RECOMMENDED: J. H. Garlage
CHECKED: E.B.H.-M.G.D. APPROVED: O. L. Walker

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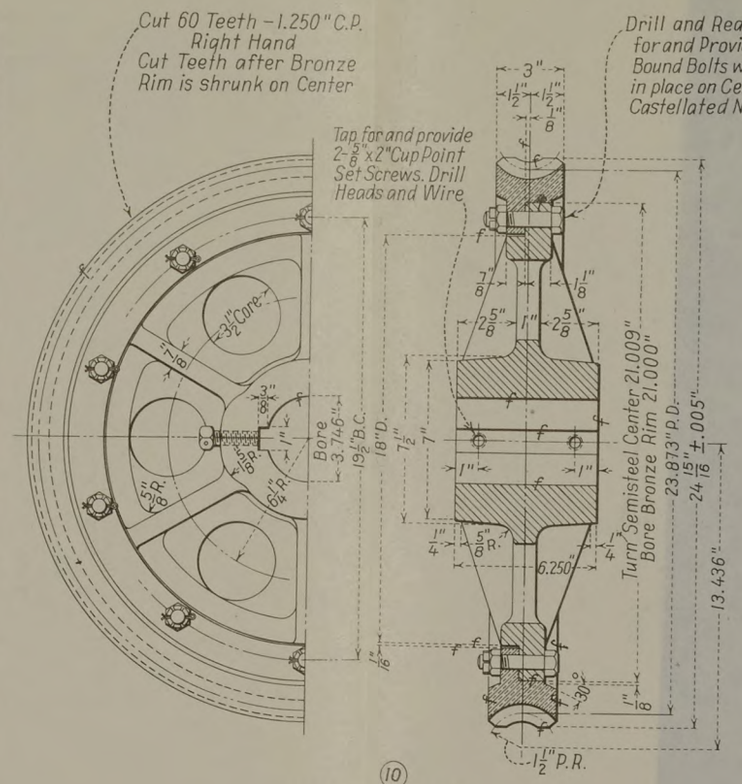
LIST OF PARTS - ONE HOIST

PART NUMBER	DESCRIPTION	MATERIAL	NUMBER REQUIRED	DRAWING NUMBER
1	Gear Housing	Semisteel and Bronze	1	40-D-452
2	Cover Plate	Semisteel	1	" "
3	Thrust Washer	Steel	2	" "
4	Thrust Washer	Bronze	2	" "
5	Bearing Carrier (Worm)	Semisteel	2	" "
6	Shim - 8 7/8" x 6 9/32"	Sheet Steel	1	" "
7	Gland	Bronze	2	" "
8	Packing 3/8" Square	Garlock No.99 or equal	8 Rings	" "
9	Gear Guard	Mild Steel	1	" "
10	Worm Gear	Bronze Rim-Semisteel Center	1	40-D-453
11	Spur Gear	Cast Steel	1	" "
12	Spur Pinion and Shaft	Forged Steel	1	" "
13	Worm	Alloy Steel	1	" "
14	Reversible Ratchet Wrench	Keystone Manufacturing Co.	*	" "
15	Bed Frame (Right Hand)	Semisteel	1	40-D-454
16	Bed Frame (Left Hand)	Semisteel	1	" "
17	Pillow Block	Semisteel	2	" "
18	Bearing Carrier (Pinion)	Semisteel	4	40-D-455
19	Drum Cover (Right Hand)	Sheet Steel	1	" "
20	Drum Cover (Left Hand)	Sheet Steel	1	" "
21	Bearing Thrust Nut	Steel	4	" "
22	Drum and Spur Gear (R.H.)	Electric Furnace Cast Steel	1	" "
23	Drum and Spur Gear (L.H.)	Electric Furnace Cast Steel	1	" "
24	Drum and Spur Gear Shaft	Cold Finished Steel Shafting	2	40-D-456
25	Pinion and Shaft	Alloy Steel	2	" "
26	Intermediate Drive Shaft	Cold Finished Steel Shafting	1	" "
27	L.S. Support Plate	Steel	1	" "
28	L.S. Bevel Gear	Brass	1	" "
29	L.S. Bevel Pinion	Steel	1	" "
30	L.S. Plate Stud	Bolt Steel - Class "B"	2	" "
31	Hoisting Rope	3/8" x 6" Plow Steel - Galvanized	2	" "
32	Shim - 10" x 7 9/32"	Sheet Steel	4	" "
33	Worm Roller Bearing	Timken-Cone 78250 - Cup 78551	2	No Detail
34	Pinion Roller Bearing	Timken-Cone 759 - Cup 752	4	" "
35	Drum Roller Bearing	Timken-Cone 938 - Cup 932	4	" "
36	Flexible Coupling	Ajax No.3 1/8A-Light Duty or equal	2	" "
37	Limit Switch	General Electric Co. L.S. 80 - J	1	" "
38	Alemite Fitting No. A-359	Standard Alemite - 1/4" Pipe Shank	6	" "
39	Alemite Compressor No.C-700	Standard Alemite	*	" "
40	Alemite Hose No. A-1039	Standard Alemite	*	" "

* See Specifications for Number Required

NOTES

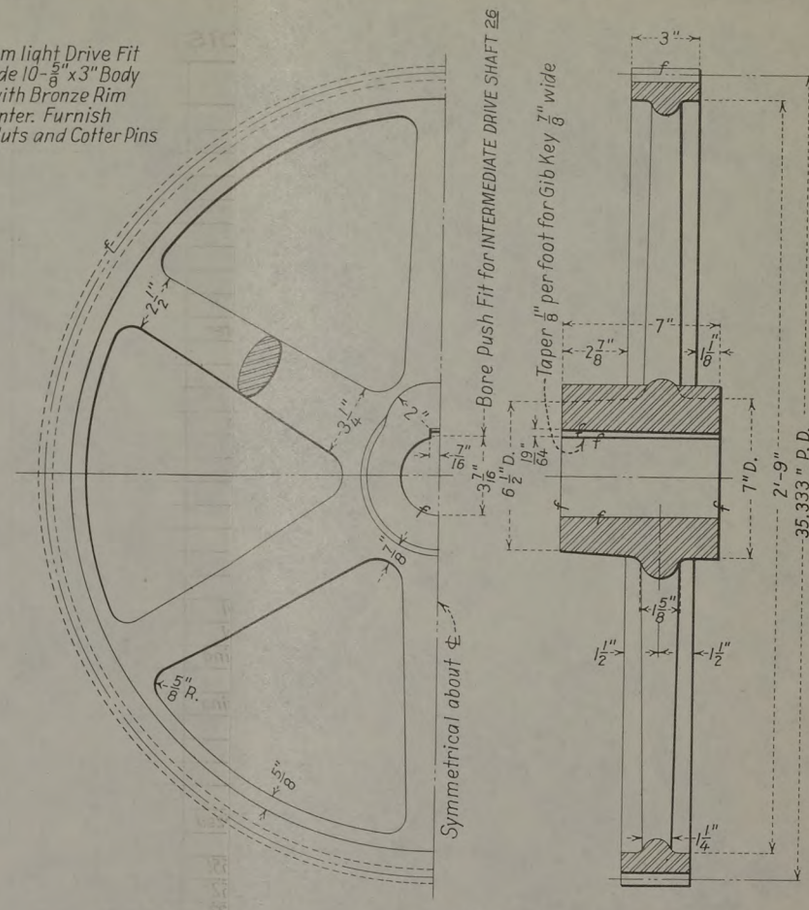
All Bolts and Studs to be of Class "B" Bolt Steel Bolts Semifinished. Studs Finished. Nuts to be cold punched, chamfered and trimmed, Commercial Grade. Bolt Heads and Nuts Hexagon. See Detail Drawings for Sizes and Number Required



(10)

WORM GEAR

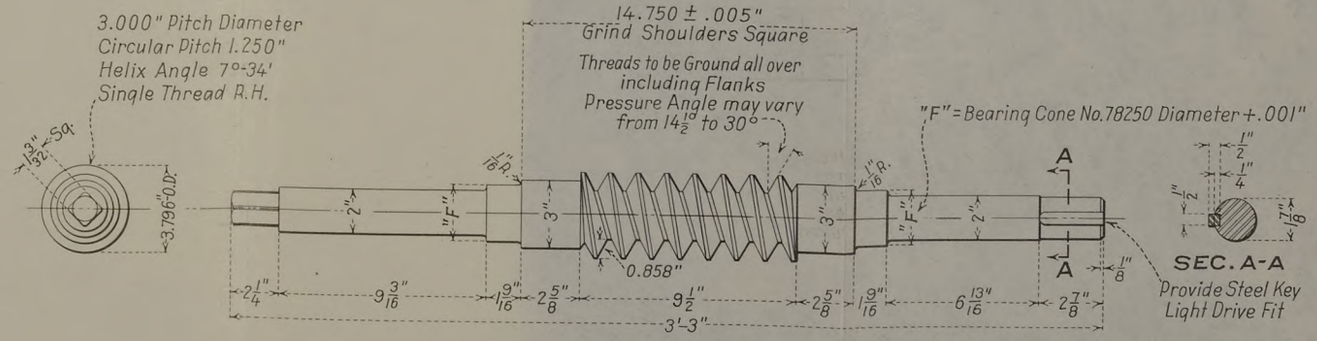
BRONZE RIM — SEMISTEEL CENTER
ONE REQUIRED



(11)

SPUR GEAR

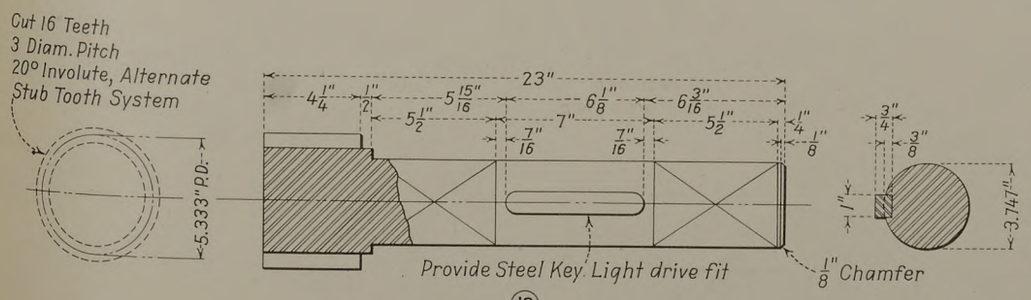
CAST STEEL — ONE REQUIRED



(13)

WORM

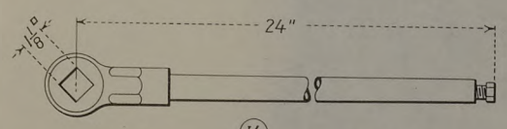
ALLOY STEEL — ONE REQUIRED
Finish-Heat Treat-Case Harden and Grind Diameters



(12)

SPUR PINION AND SHAFT

FORGED STEEL - ONE REQUIRED
Finish all over



(14)

REVERSIBLE RATCHET WRENCH

Keystone Mfg. Co. Catalog No. 28
Tap Wrench No.66 or equal

DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
DENVER OFFICE

BACK GEARED DOUBLE DRUM HOIST
GEARS AND LIST OF PARTS
CAPACITY 60,000 POUNDS

DRAWN: B.H.S. SUBMITTED: C.M. Dyer
TRACED: J.J.S.AAA RECOMMENDED: J.L. Savage
CHECKED: E.B.H.MCD APPROVED: A.F. Walter

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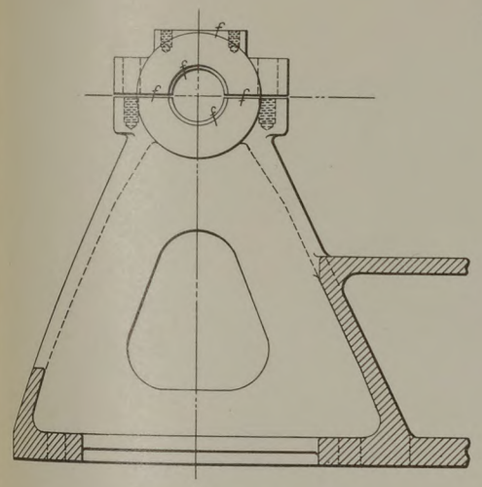
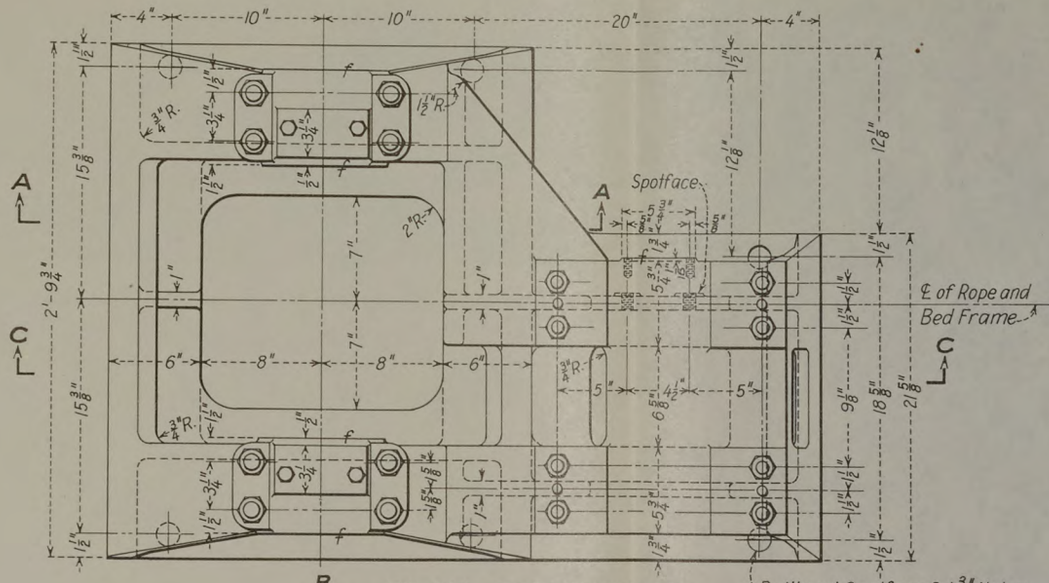
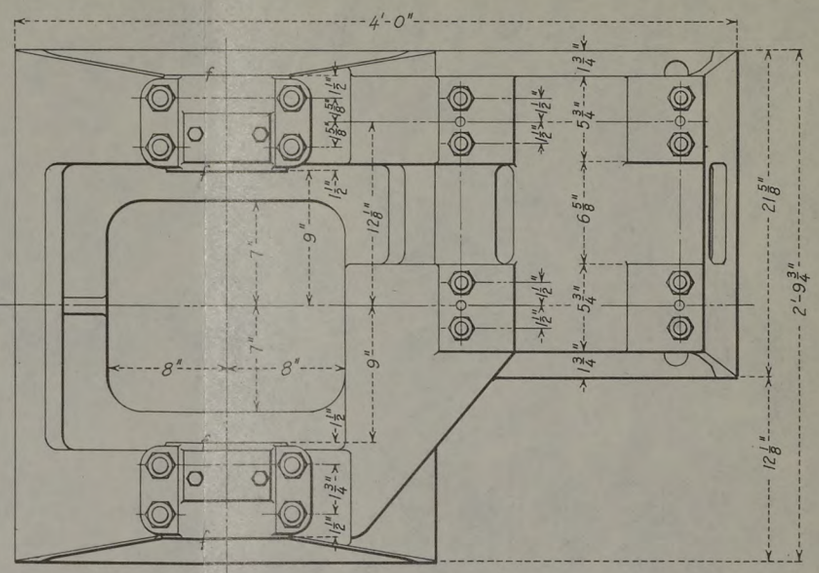


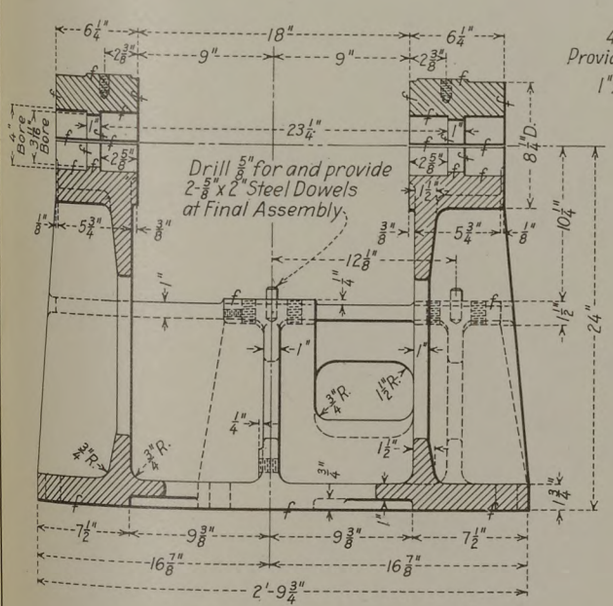
SECTION A-A



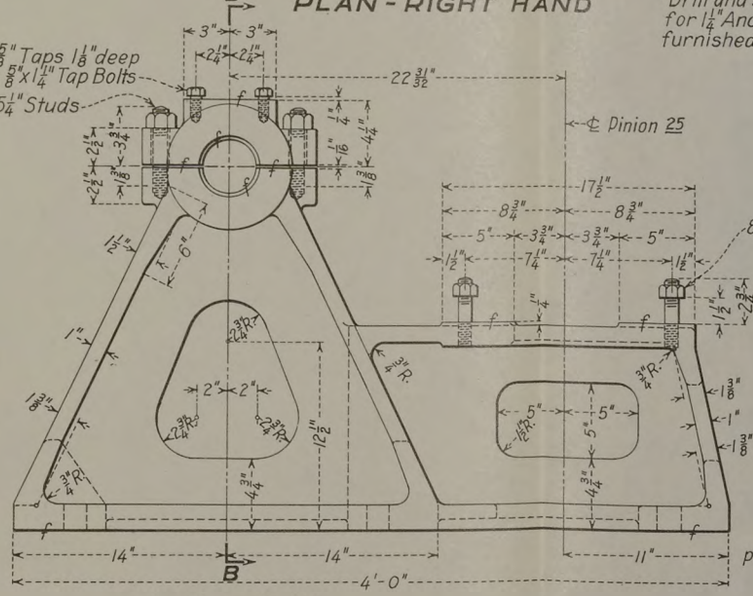
PLAN - RIGHT HAND

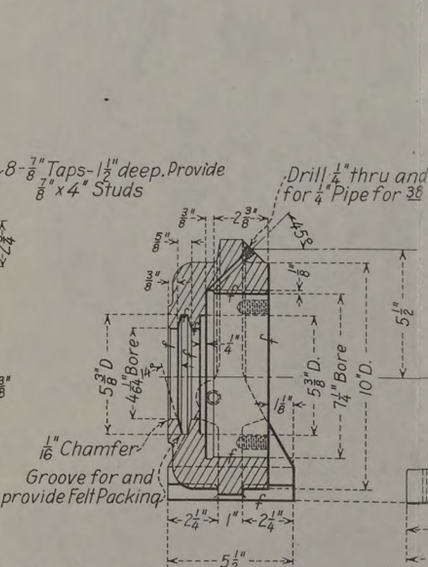


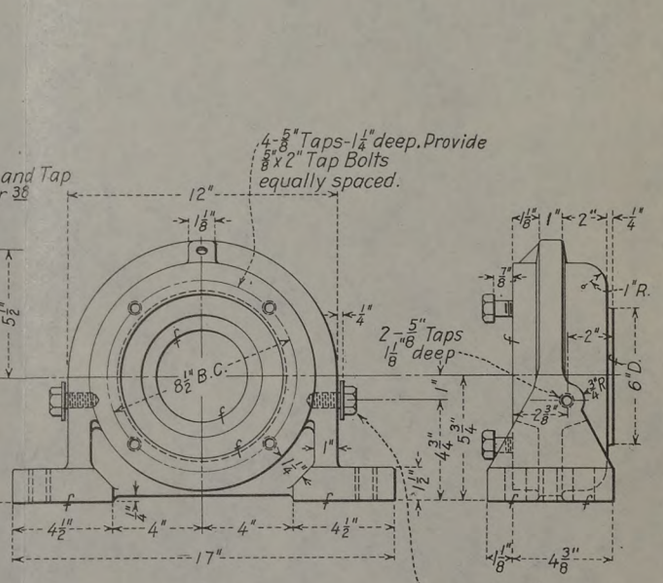
PLAN - LEFT HAND



SECTION B-B



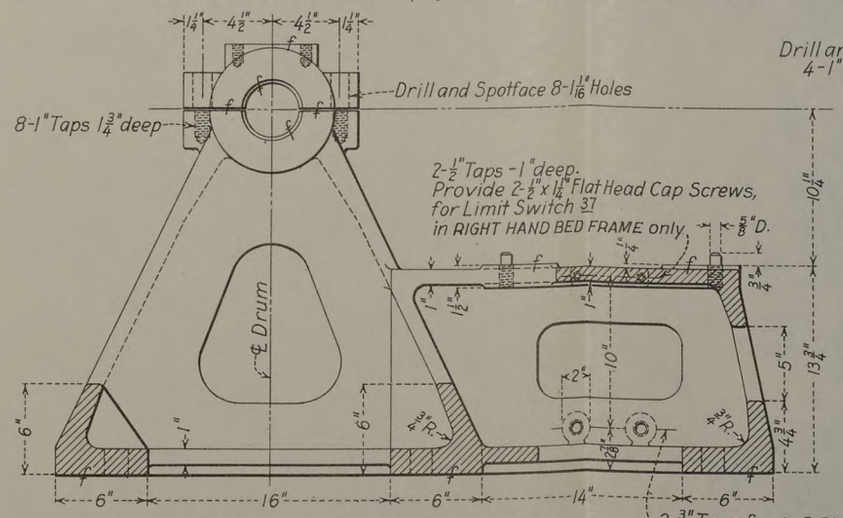




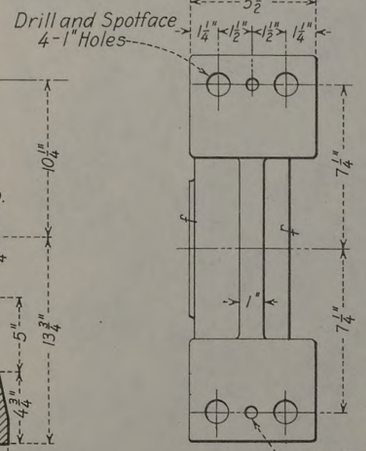
(17)

PILLOW BLOCK

SEMISTEEL - FOUR REQUIRED



SECTION C-C



BED FRAME

SEMISTEEL

(15)

ONE REQUIRED - RIGHT HAND

(16)

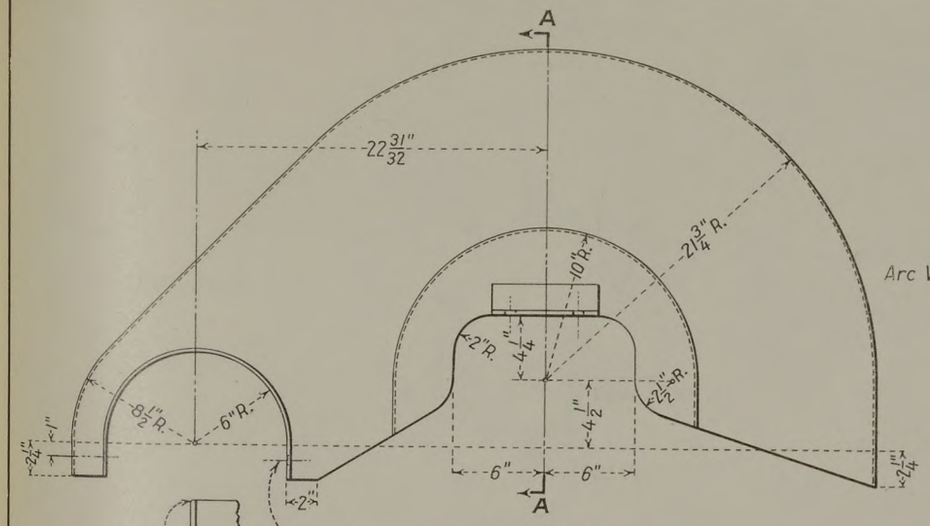
ONE REQUIRED - LEFT HAND

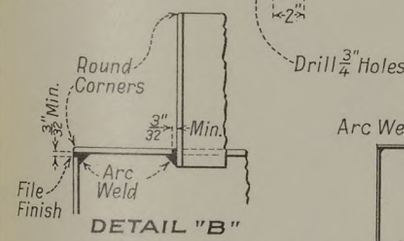
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
DENVER OFFICE

BACK GEARED DOUBLE DRUM HOIST
BED FRAME AND PILLOW BLOCK
CAPACITY. 60,000 POUNDS

DRAWN: B.H.S. SUBMITTED: C.W. Dorg
TRACED: J.E.V. RECOMMENDED: J.L. Savage
CHECKED: F.B.H.-M.G.D. APPROVED: A.F. Trotter

23486	DENVER COLO., JULY 26, 1928 SHEET 4 OF 6	40-D-454





DETAIL "B"

Note:- File Finish all Exterior Welded Joints and round all Exterior Corners

DRUM COVER

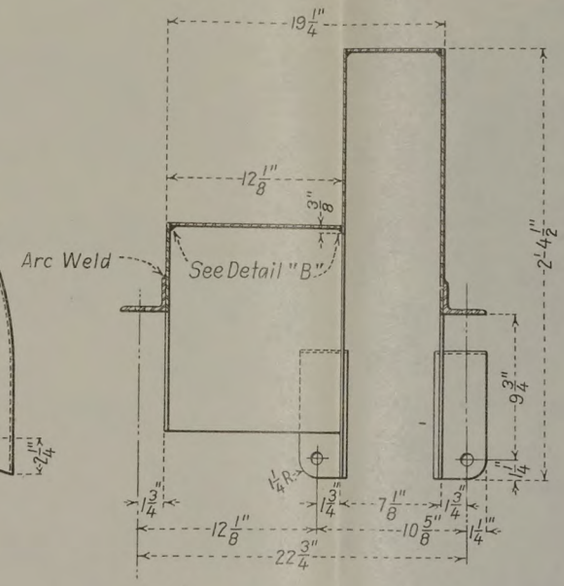
SHEET STEEL

(19)

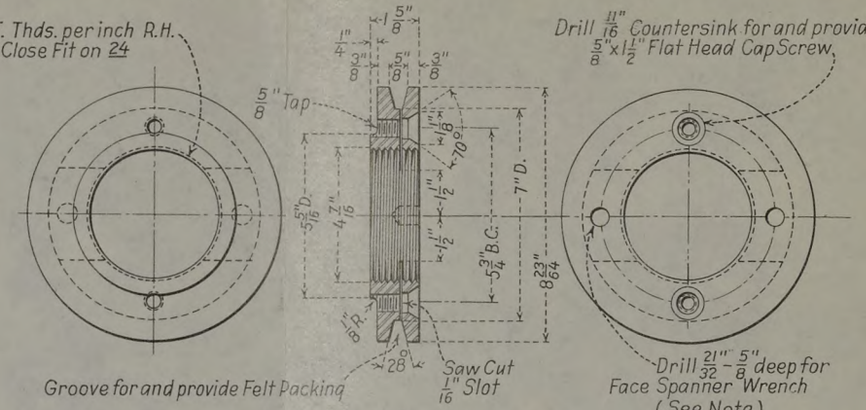
ONE REQUIRED - RIGHT HAND

(20)

ONE REQUIRED - LEFT HAND



SECTION A-A



(21)

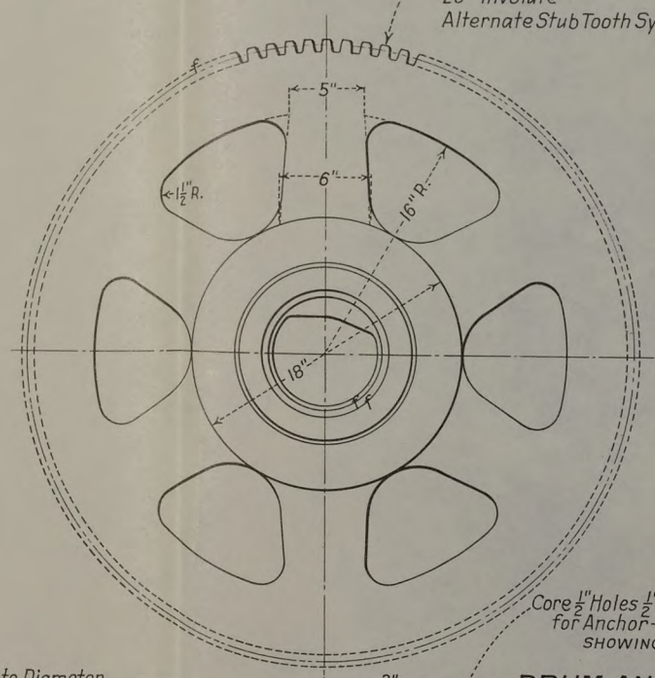
BEARING THRUST NUT

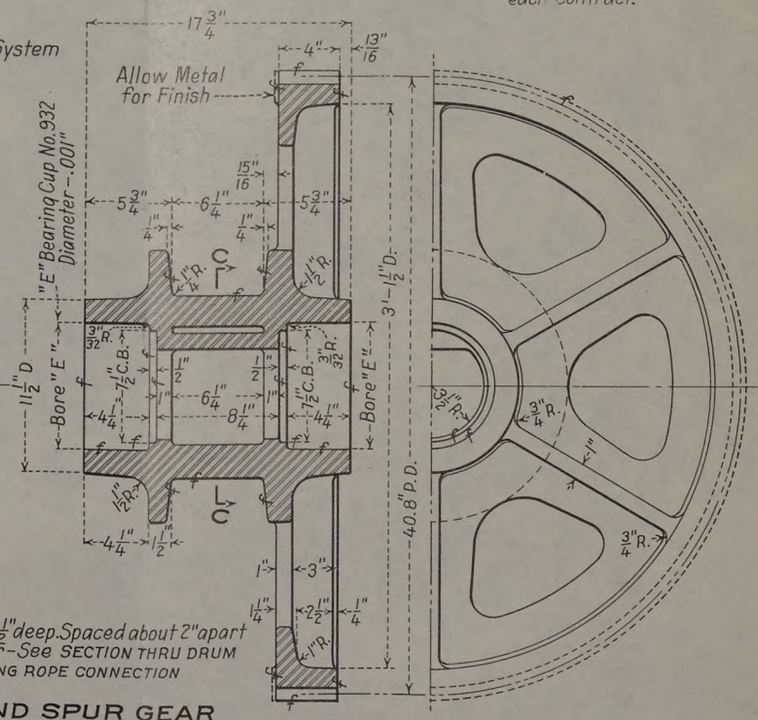
STEEL - FOUR REQUIRED

Finish all over

Note

Manufacturer to devise and furnish Wrench suitable for turning Nut 21 One only for each Contract.





Core 1" Holes 1/2" deep. Spaced about 2" apart for Anchor - See SECTION THRU DRUM SHOWING ROPE CONNECTION

DRUM AND SPUR GEAR

ELECTRIC FURNACE CAST STEEL

(22)

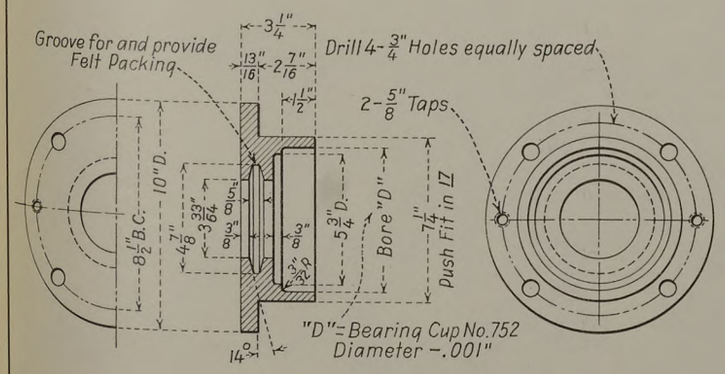
ONE REQUIRED - RIGHT HAND

(23)

ONE REQUIRED - LEFT HAND

(See Note)

Note:- For Right Hand-Tapered Slot this side of ℄ - For Left Hand- opposite side.

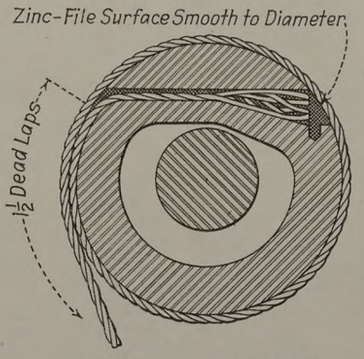


(18)

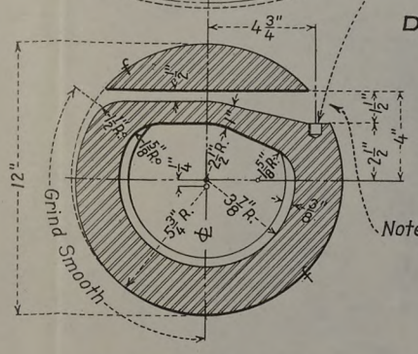
BEARING CARRIER

SEMISTEEL - FOUR REQUIRED

Finish all over



SECTION THRU DRUM SHOWING ROPE CONNECTION



SECTION C-C (ENLARGED)

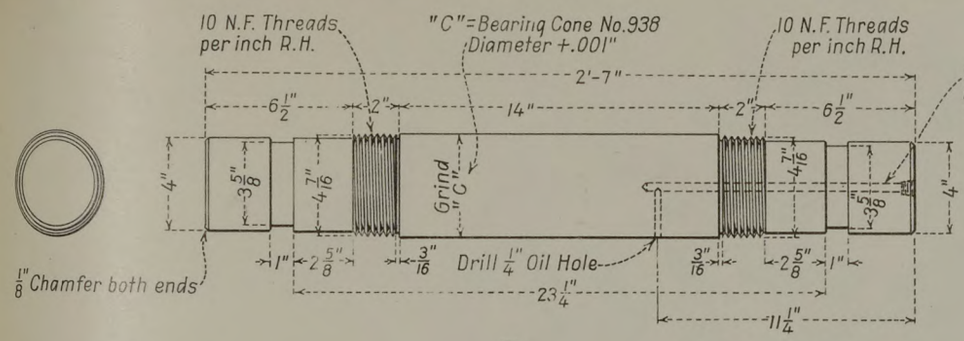
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
DENVER OFFICE

BACK GEARED DOUBLE DRUM HOIST

DRUM - BEARING CARRIER - THRUST NUT

CAPACITY 60,000 POUNDS

DRAWN: B.H.S. SUBMITTED: C.M. Day		
TRACED: A.A.A. RECOMMENDED: J.P. Savage		
CHECKED: E.B.H. M.G.D. APPROVED: A.J. Walker		
23487	DENVER COLO., JULY 26, 1928 SHEET 5 OF 6	40-D-455

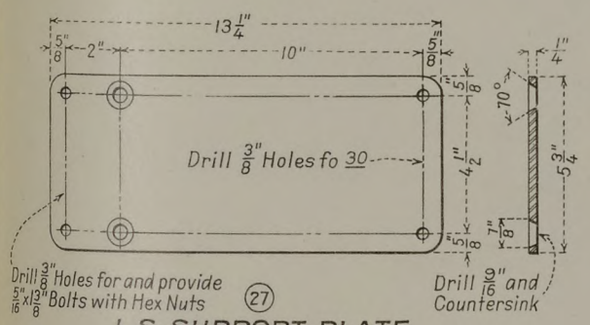


(24)

DRUM AND SPUR GEAR SHAFT

COLD FINISHED STEEL SHAFTING-TWO REQUIRED

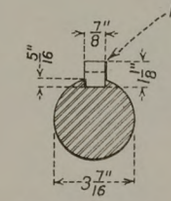
Finish all over



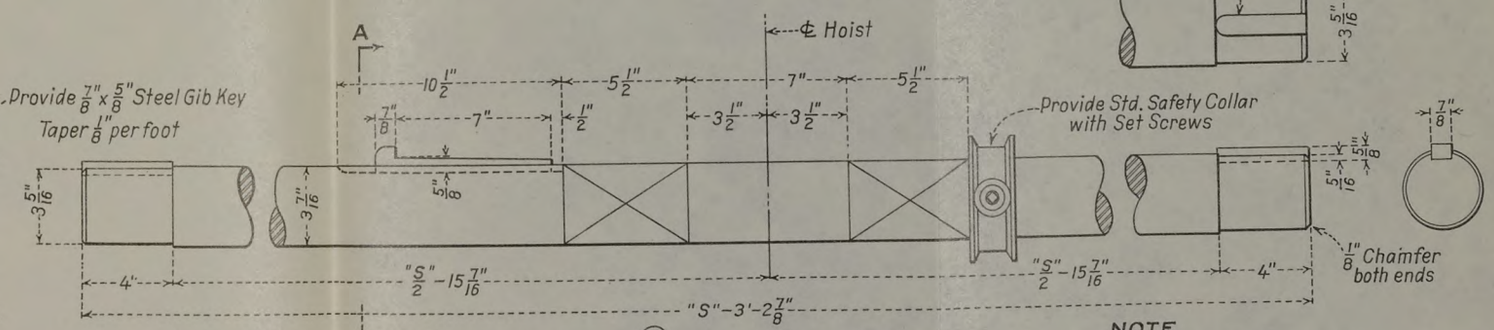
(27)

L.S. SUPPORT PLATE

STEEL-ONE REQUIRED



SEC. A-A



(26)

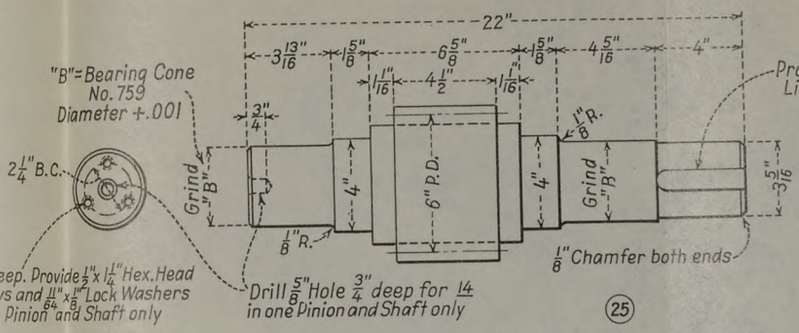
INTERMEDIATE DRIVE SHAFT

COLD FINISHED STEEL SHAFTING-ONE REQUIRED

NOTE

See Specifications for "S"

("S" equals distance between ℄s of Drums)

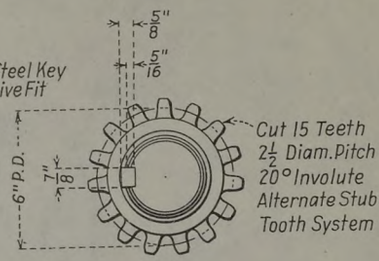


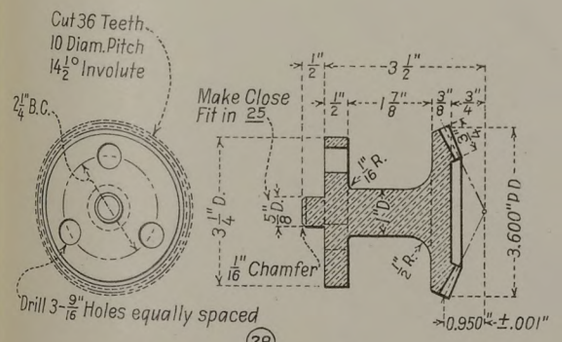
(25)

PINION AND SHAFT

ALLOY STEEL-TWO REQUIRED

Finish and Heat Treat



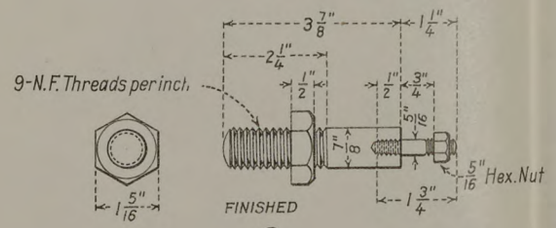


(28)

L.S. BEVEL GEAR

BRASS-ONE REQUIRED

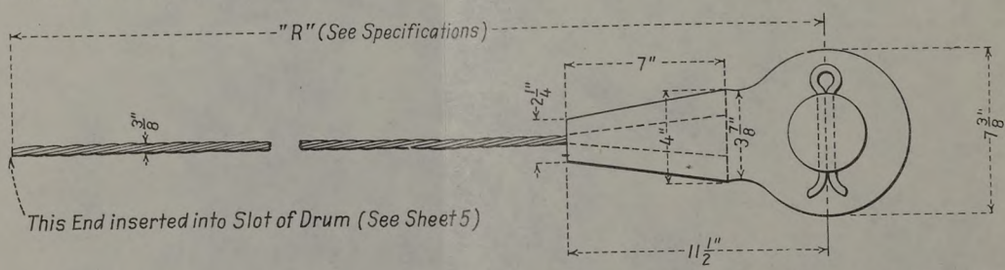
Finish all over

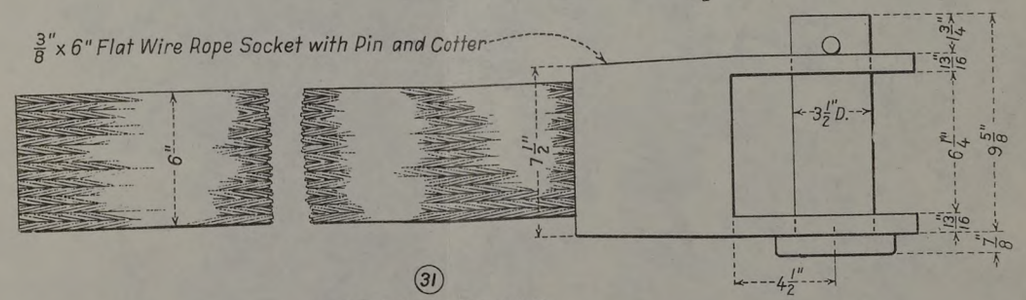


(30)

L.S. PLATE STUD

BOLT STEEL-CLASS "B"-TWO REQUIRED



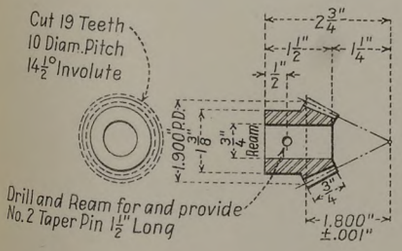


(31)

HOISTING ROPE

3/8"x6" PLOW STEEL WIRE ROPE-GALVANIZED

TWO REQUIRED AS SHOWN

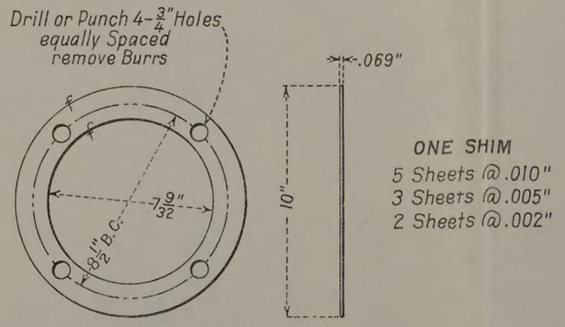


(29)

L.S. BEVEL PINION

STEEL-ONE REQUIRED

Finish all over



ONE SHIM

5 Sheets @.010"

3 Sheets @.005"

2 Sheets @.002"

(32)

SHIM

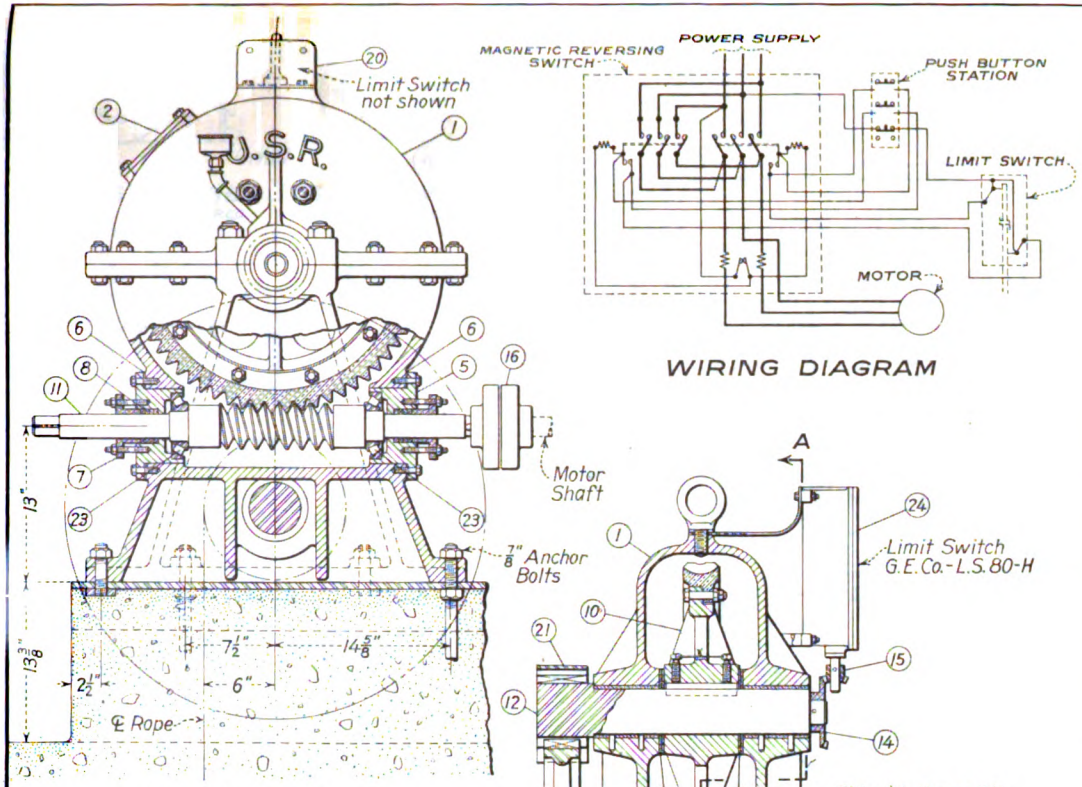
SHEET STEEL-FOUR REQUIRED

DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
DENVER OFFICE

BACK GEARED DOUBLE DRUM HOIST
GEARS-SHAFTS-HOISTING ROPE
CAPACITY 60,000 POUNDS

DRAWN: B.H.S. SUBMITTED: C.M. Day
TRACED: A-A-A RECOMMENDED: J.L. Savage
CHECKED: E.B.H-M.G.D. APPROVED: A.F. Walter

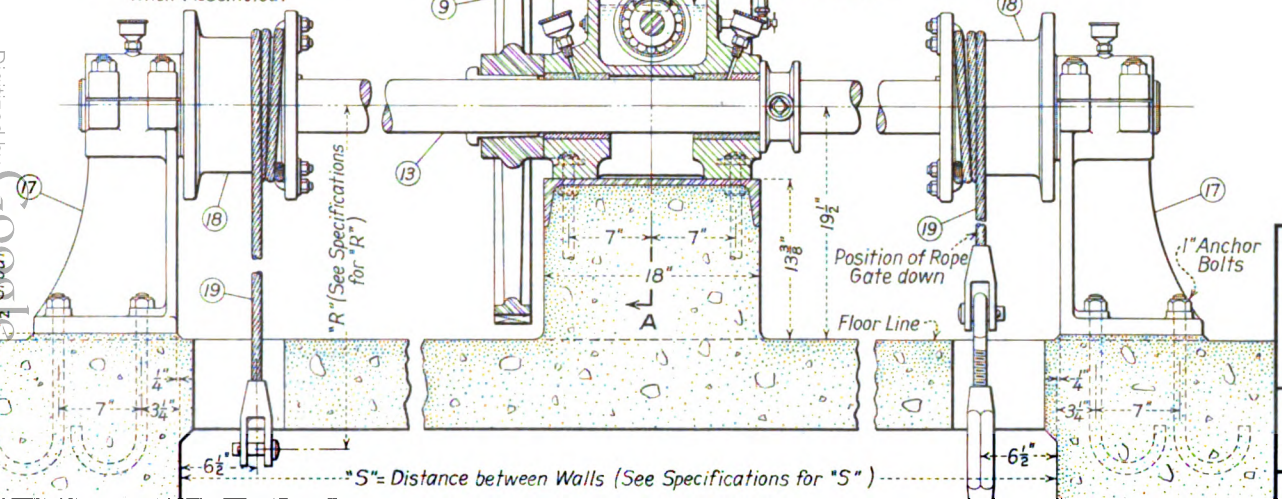
23488	DENVER COLO., JULY 26, 1928 SHEET 6 OF 6	40-D-456



WIRING DIAGRAM

SECTION A-A

Provide 0.010" End Play for Worm when Assembled.



LIST OF PARTS - ONE HOIST

PART NUMBER	DESCRIPTION	MATERIAL	NUMBER REQUIRED	SHEET NUMBER
1	Gear Housing	Semisteel and Bronze	1	2
2	Cover Plate	Semisteel	1	2
3	Thrust Washer	Bronze	2	2
4	Thrust Washer	Steel	2	2
5	Bearing Carrier	Semisteel	2	2
6	Shim	Sheet Steel	1	2
7	Gland	Bronze	2	2
8	Packing 3/8" Sq.	Garlock No. 99 or equal	8 Rings	2
9	Spur Gear	Cast Steel	1	3
10	Worm Gear	Bronze and Cast Iron	1	3
11	Worm	Alloy Steel	1	3
12	Spur Pinion and Shaft	Forged Steel	1	3
13	Drum Shaft	Cold Finished Steel Shafting	1	3
14	Bevel Gear	Bronze	1	3
15	Bevel Pinion	Bronze or Steel	1	3
16	Flexible Coupling	Ajax No. 1 3/4 A Light Duty or equal	1	3
17	Drum Shaft Bearing	Cast Iron	2	4
18	Drum	Cast Iron	2	4
19	Hoisting Rope - 3/4" Dia.	Plow Steel - Galvanized	2	4
20	Limit Switch Plate	Steel	1	4
21	Gear Guard	Mild Steel	1	4
22	Reversible Ratchet Wrench	Keystone Mfg. Co. (See Detail)	*	4
23	Roller Bearing	Timken-Cup No. 78,551 - Cone No. 78,250	2	1
24	Limit Switch	General Electric Co. L.S.-80 H	1	1

* See Specifications for Number Required

NOTES

All Bolts and Studs to be of Class "B" Bolt Steel. Bolts semifinished. Studs finished. Nuts to be cold punched, chamfered and trimmed, Commercial Grade. Bolt Heads and Nuts Hexagon. See Detail Drawings for Sizes and Number required.

Base and Anchor Bolts for Hoist furnished by the Government.

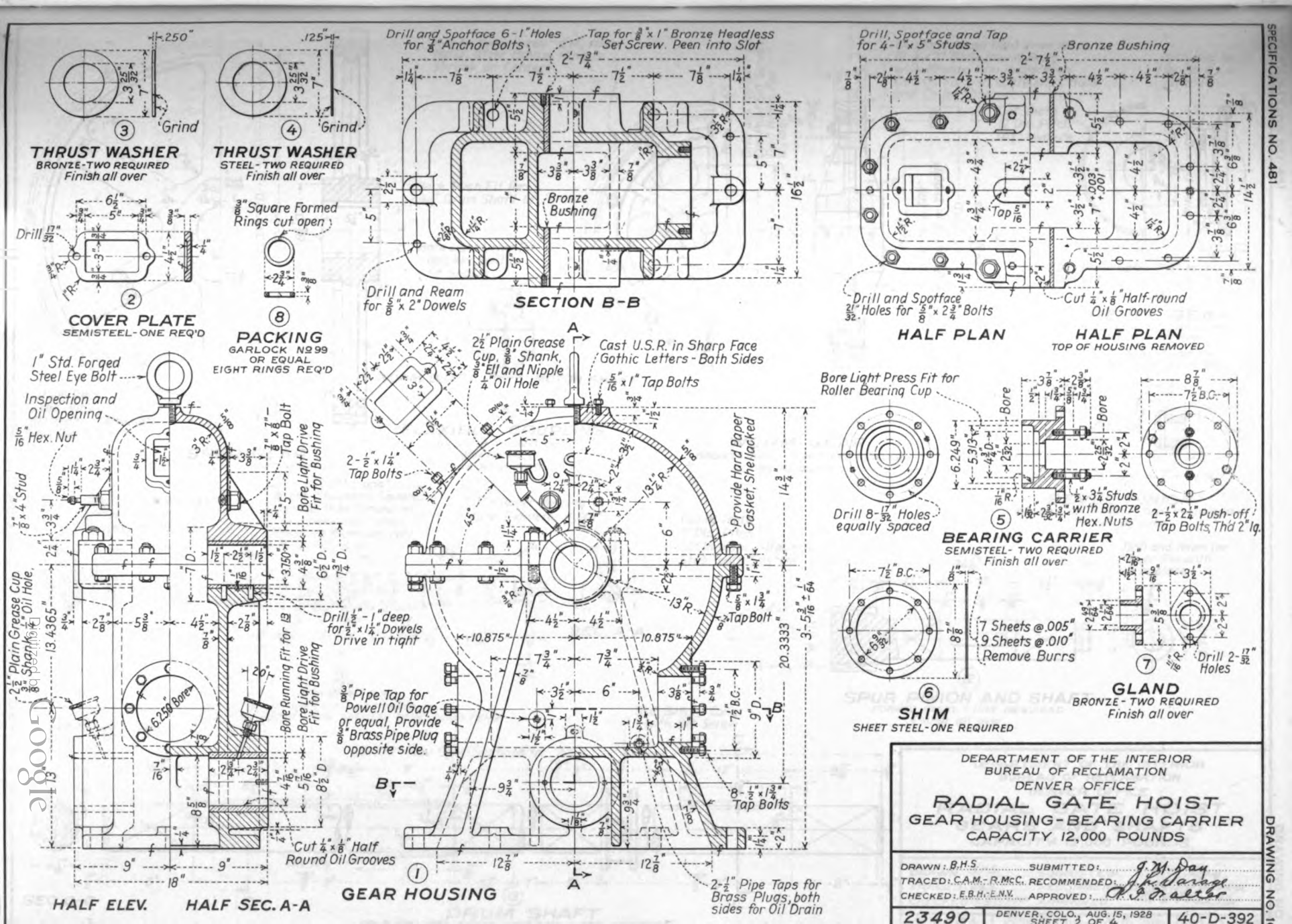
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
DENVER OFFICE

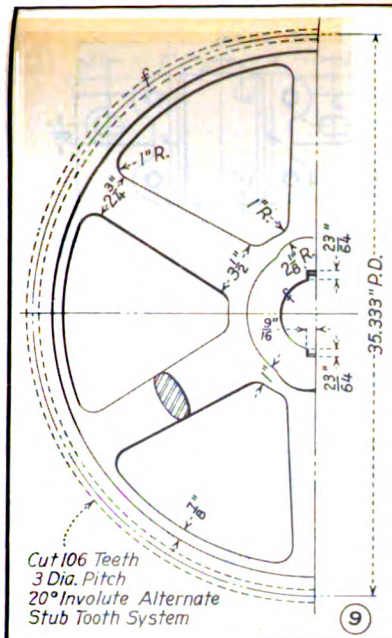
RADIAL GATE HOIST

GENERAL ASSEMBLY - LIST OF PARTS

CAPACITY 12,000 POUNDS

DRAWN: B.H.S.	SUBMITTED: C.W. Day		
TRACED: J.J.S.	RECOMMENDED: J.L. Savage		
CHECKED: E.B.H. E.N.V.	APPROVED: A.P. Davis		
23489	DENVER, COLO., AUG. 15, 1928 SHEET 1 OF 4	40-D-391	

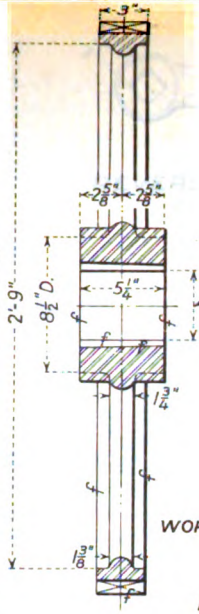

SPECIFICATIONS NO. 481
DRAWING NO. 1
Google
.250"
.125"
Grind
3
THRUST WASHER
BRONZE-TWO REQUIRED
Finish all over
4
THRUST WASHER
STEEL-TWO REQUIRED
Finish all over
Drill 17/32"
2
COVER PLATE
SEMISTEEL-ONE REQ'D
Square Formed Rings cut open
8
PACKING
GARLOCK N299
OR EQUAL
EIGHT RINGS REQ'D
Drill and Spotface 6-1" Holes for 7/8" Anchor Bolts
Tap for 3/8" x 1" Bronze Headless Set Screw. Peen into Slot
Bronze Bushing
Drill and Ream for 1 5/8" x 2" Dowels
SECTION B-B
Drill, Spotface and Tap for 4-1" x 5" Studs
Bronze Bushing
Tap 1/16"
Drill and Spotface 21/32" Holes for 1 5/8" x 2 3/4" Bolts
Cut 1/4" x 1/8" Half-round Oil Grooves
HALF PLAN
HALF PLAN
TOP OF HOUSING REMOVED
1" Std. Forged Steel Eye Bolt
Inspection and Oil Opening
15/16" Hex. Nut
7/8" x 4" Stud
Tap Bolt
Bore Light Drive Fit for Bushing
2 1/2" Plain Grease Cup, 3/8" Shank, 1/4" Oil Hole, Ell and Nipple
Drill 1/2" - 1" deep for 1/2" x 1 1/4" Dowels Drive in tight
Bore Running Fit for
Bore Light Drive Fit for Bushing
Cut 1/4" x 1/8" Half Round Oil Grooves
HALF ELEV.
HALF SEC. A-A
2 1/2" Plain Grease Cup, 3/8" Shank, 1/4" Oil Hole, Ell and Nipple
2 1/2" Plain Grease Cup, 3/8" Shank, 1/4" Oil Hole
Cast U.S.R. in Sharp Face Gothic Letters - Both Sides
5/16" x 1" Tap Bolts
2-1/2" x 1 1/4" Tap Bolts
Provide Hard Paper Gasket, Shellacked
Tap Bolt
3/8" Pipe Tap for Powell Oil Gage or equal, Provide 3/8" Brass Pipe Plug opposite side.
8-1/2" x 1 3/4" Tap Bolts
2-1/2" Pipe Taps for Brass Plugs, both sides for Oil Drain
GEAR HOUSING
Bore Light Press Fit for Roller Bearing Cup
Drill 8-17/32" Holes equally spaced
1/2" x 3 1/4" Studs with Bronze Hex. Nuts
2-1/2" x 2 1/4" Push-off Tap Bolts, Thd 2" lg.
5
BEARING CARRIER
SEMISTEEL- TWO REQUIRED
Finish all over
7 Sheets @.005"
9 Sheets @.010"
Remove Burrs
6
SHIM
SHEET STEEL-ONE REQUIRED
Drill 2-17/32" Holes
7
GLAND
BRONZE - TWO REQUIRED
Finish all over
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
DENVER OFFICE
RADIAL GATE HOIST
GEAR HOUSING-BEARING CARRIER
CAPACITY 12,000 POUNDS
DRAWN: B.H.S. SUBMITTED: J.M. Day
TRACED: C.A.M.-R.McC. RECOMMENDED: J.L. Savage
CHECKED: E.B.H.-E.N.V. APPROVED: C.S. Walker
23490
DENVER, COLO. AUG. 15, 1928
SHEET 2 OF 4
40-D-392



(9)

SPUR GEAR

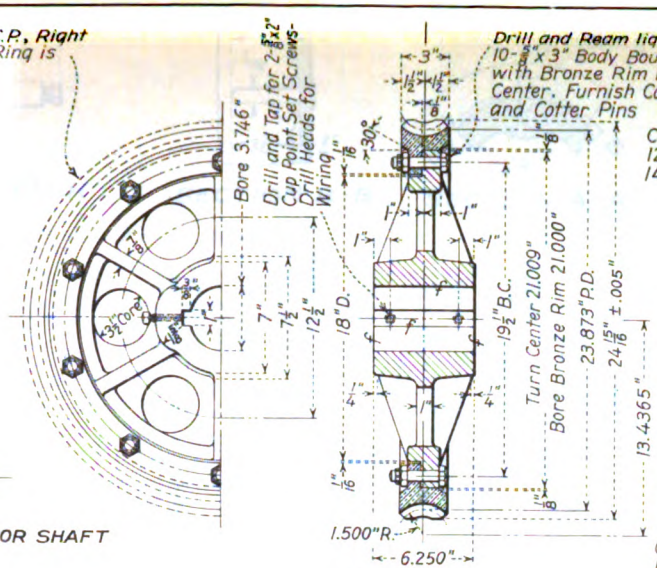
CAST STEEL – ONE REQUIRED



(16)

FLEXIBLE COUPLING

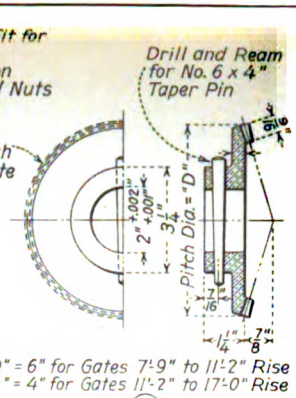
AJAX NO. 1 3/4 A–LIGHT DUTY
(OR EQUAL)
ONE REQUIRED



(10)

WORM GEAR

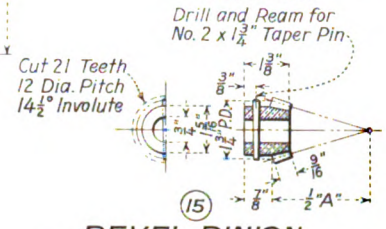
BRONZE RIM – SEMISTEEL CENTER
ONE REQUIRED



(14)

BEVEL GEAR

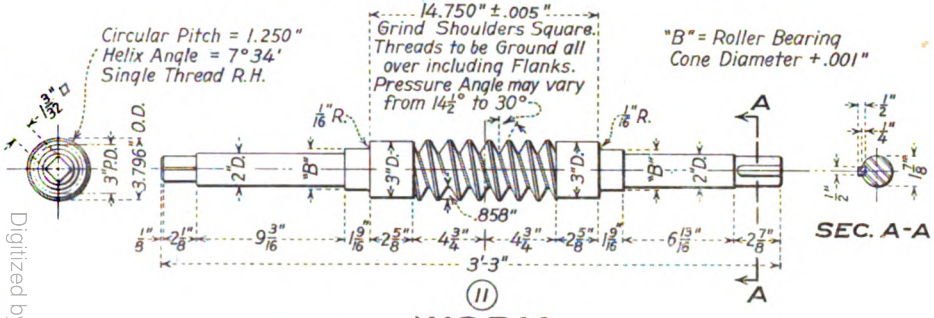
BRONZE – ONE REQUIRED
Finish all over



(15)

BEVEL PINION

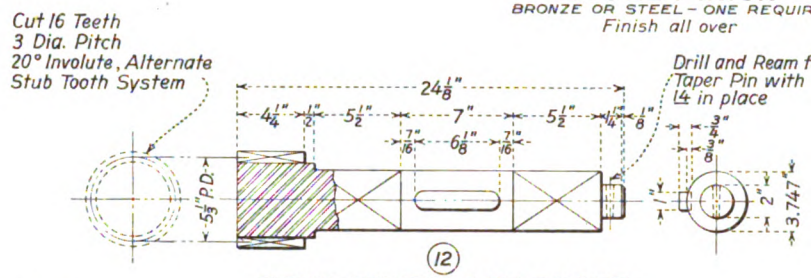
BRONZE OR STEEL – ONE REQUIRED
Finish all over



(11)

WORM

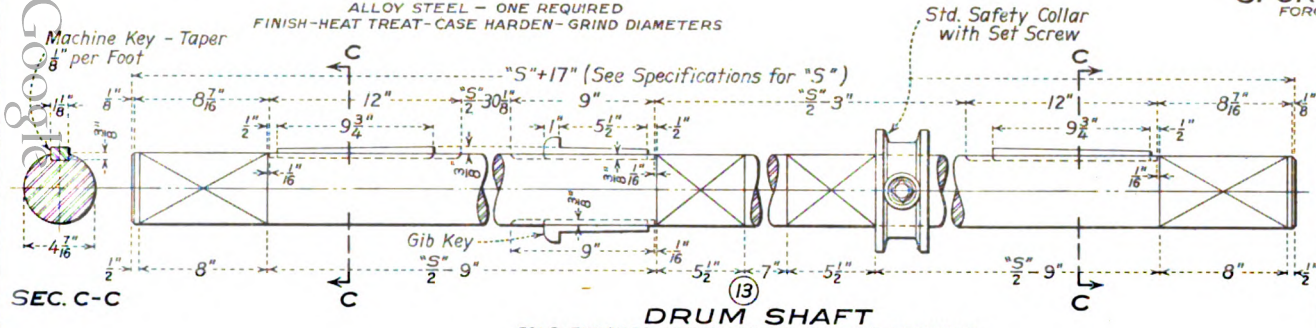
ALLOY STEEL – ONE REQUIRED
FINISH-HEAT TREAT-CASE HARDEN-GRIND DIAMETERS



(12)

SPUR PINION AND SHAFT

FORGED STEEL – ONE REQUIRED
Finish all over



(13)

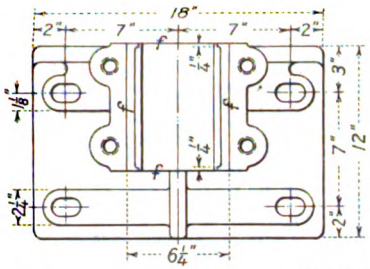
DRUM SHAFT

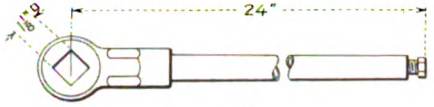
COLD FINISHED STEEL SHAFTING – ONE REQUIRED

DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
DENVER OFFICE

RADIAL GATE HOIST
GEARS AND SHAFTS
CAPACITY 12,000 POUNDS

DRAWN: B.H.S.	SUBMITTED: C.W. Dey	
TRACED: J.J.S.	RECOMMENDED: A.H. Garage	
CHECKED: E.B.H-E.N.V.	APPROVED: O.F. Nalter	
23491	DENVER, COLO., AUG. 15, 1928 SHEET 3 OF 4	40-D-393

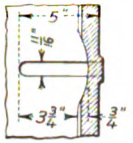




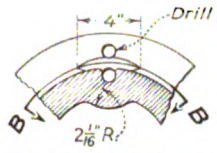
(22)

REVERSIBLE RATCHET WRENCH

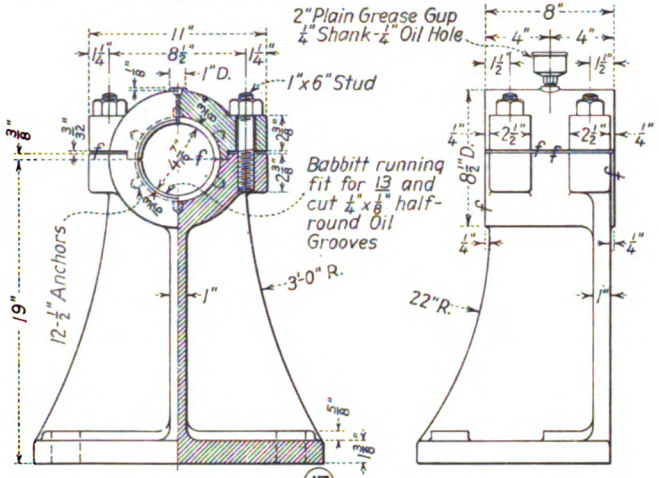
Keystone Mfg. Co. Catalog No. 28
Tap Wrench No. 66 or equal



SECTION B-B



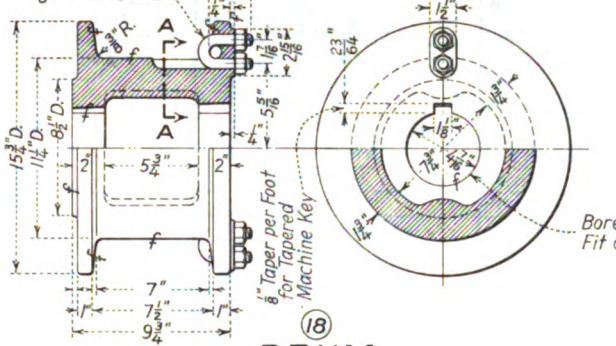
SECTION A-A



(17)

DRUM SHAFT BEARING

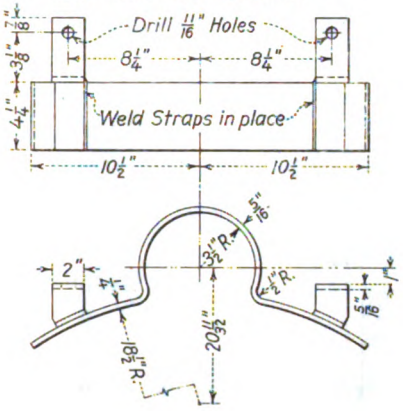
CAST IRON – TWO REQUIRED



(18)

DRUM

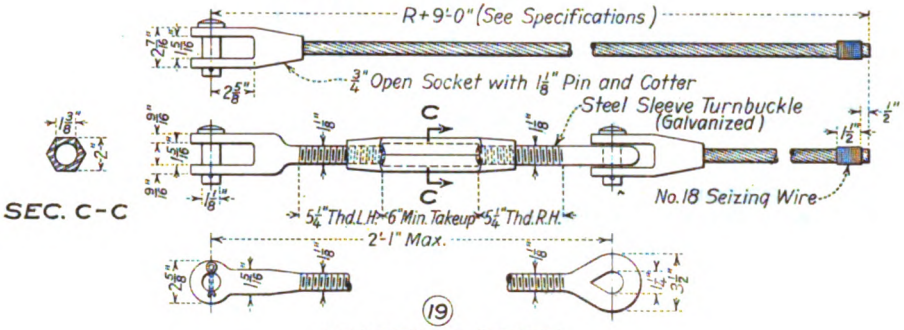
CAST IRON – TWO REQUIRED



(21)

GEAR GUARD

MILD STEEL – TWO REQUIRED

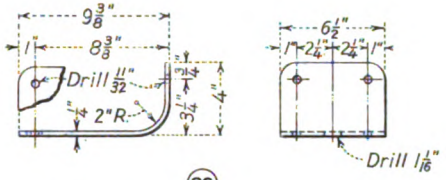


SEC. C-C

(19)

HOISTING ROPE

¾" DIAMETER – 6 STRANDS – 19 WIRES – PLOW STEEL – GALVANIZED
ONE REQUIRED WITH SPECIAL TURNBUCKLE AS SHOWN
ONE REQUIRED WITHOUT SPECIAL TURNBUCKLE AS SHOWN



(20)

LIMIT SWITCH PLATE

STEEL – TWO REQUIRED

DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
DENVER OFFICE

RADIAL GATE HOIST

DRUM-DRUM SHAFT BEARING-GEAR GUARD

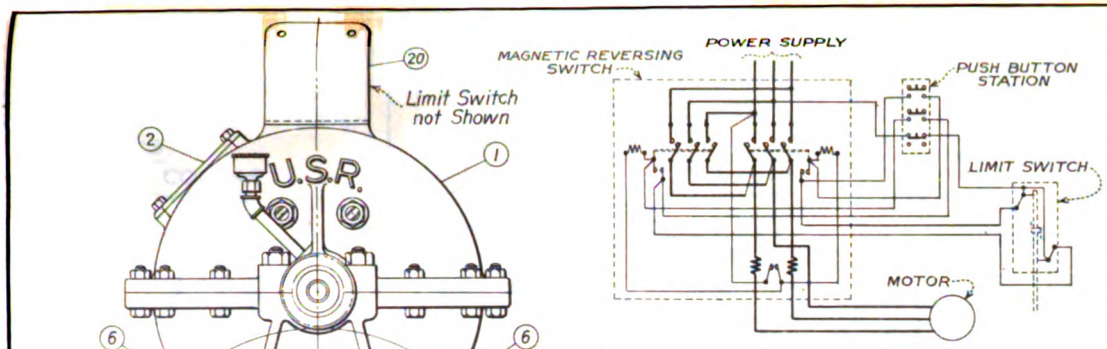
CAPACITY 12,000 POUNDS

DRAWN: B.H.S.	SUBMITTED:	C.W. Dye	
TRACED: C.A.M.-J.J.S.	RECOMMENDED:	J.L. Savage	
CHECKED: E.B.H.-E.N.V.	APPROVED:	O.S. Walker	

23492	DENVER, COLO., AUG. 15, 1928 SHEET 4 OF 4	40-D-394

SPECIFICATIONS NO. 481

DRAWING NO. 1



WIRING DIAGRAM

SECTION A-A

Provide 0.010" End Play for Worm when Assembled.

LIST OF PARTS - ONE HOIST

PART NUMBER	DESCRIPTION	MATERIAL	NUMBER REQUIRED	SHEET NUMBER
1	Gear Housing	Semisteel and Bronze	1	2
2	Cover Plate	Semisteel	1	2
3	Thrust Collar	Bronze	2	2
4	Thrust Collar	Steel	2	2
5	Bearing Carrier	Semisteel	2	2
6	Shim	Sheet Steel	1	2
7	Gland	Bronze	2	2
8	Packing 3/8" Sq.	Garlock No. 99 or equal	6 Rings	2
9	Spur Gear	Cast Steel	1	3
10	Worm Gear	Bronze and Semisteel	1	3
11	Worm	Alloy Steel	1	3
12	Spur Pinion and Shaft	Forged Steel	1	3
13	Drum Shaft	Cold Finished Steel Shafting	1	3
14	Bevel Gear	Bronze	1	3
15	Bevel Pinion	Bronze or Steel	1	3
16	Flexible Coupling	Ajax No. 1 3/4 A Light Duty or equal	1	4
17	Drum Shaft Bearing	Cast Iron	2	4
18	Drum	Cast Iron	2	4
19	Hoisting Rope - 5/8" Dia.	Plow Steel - Galvanized	2	4
20	Limit Switch Plate	Steel	1	4
21	Gear Guard	Mild Steel	1	4
22	Reversible Ratchet Wrench	Keystone Mfg. Co. (See Detail)	*	4
23	Roller Bearing	Timken-Cup No. 78,551-Cone No. 78,250	2	1
24	Limit Switch	General Electric Co. L.S.-80-J	1	1

* See Specifications for Number Required

NOTES

All Bolts and Studs to be of Class "B" Bolt Steel. Bolts semifinished. Studs finished. Nuts to be cold punched, chamfered and trimmed, Commercial Grade. Bolt Heads and Nuts Hexagon. See Detail Drawings for Sizes and Number required.

Base and Anchor Bolts for Hoist furnished by the Government.

DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
DENVER OFFICE

RADIAL GATE HOIST

GENERAL ASSEMBLY - LIST OF PARTS

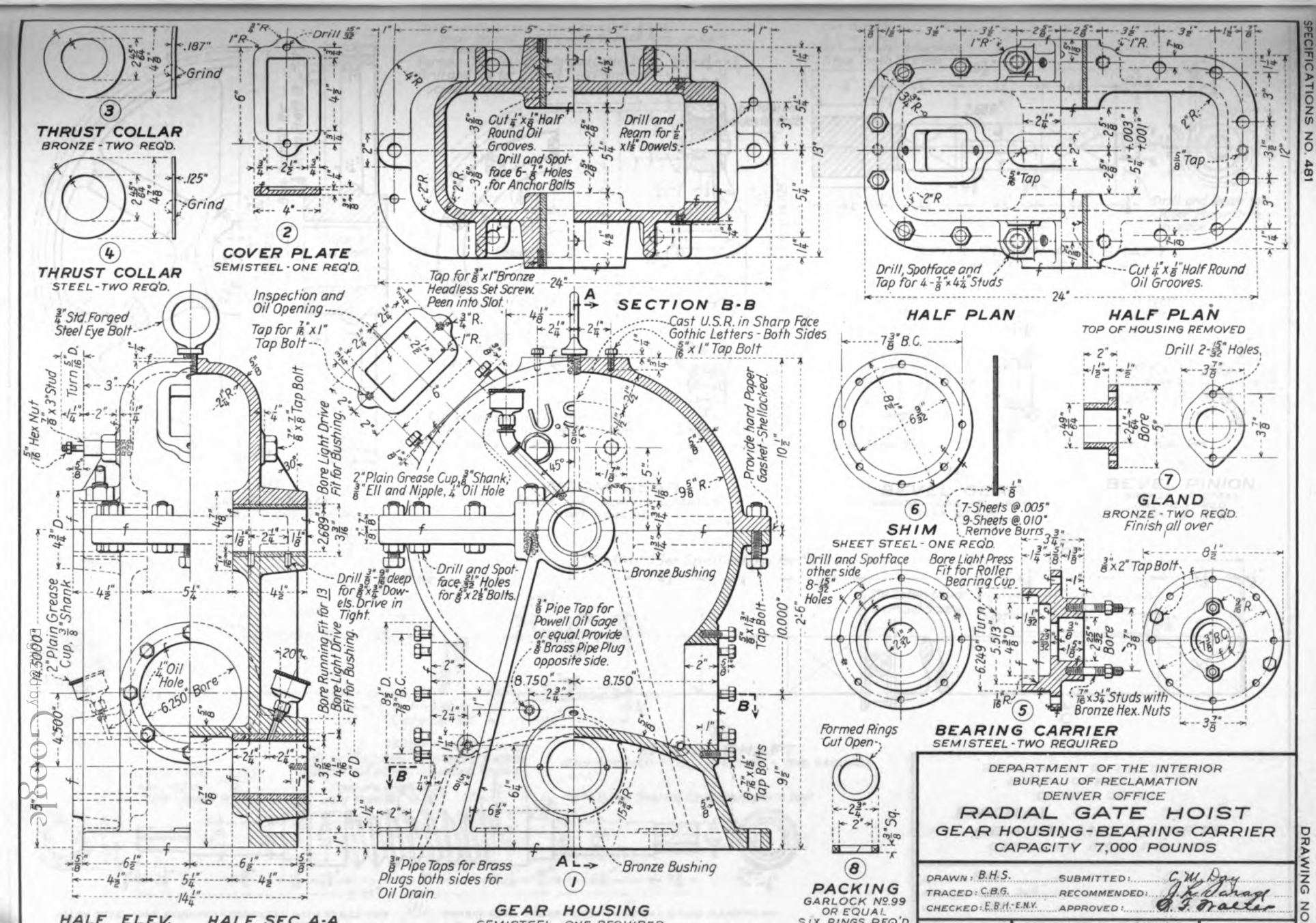
CAPACITY 7,000 POUNDS

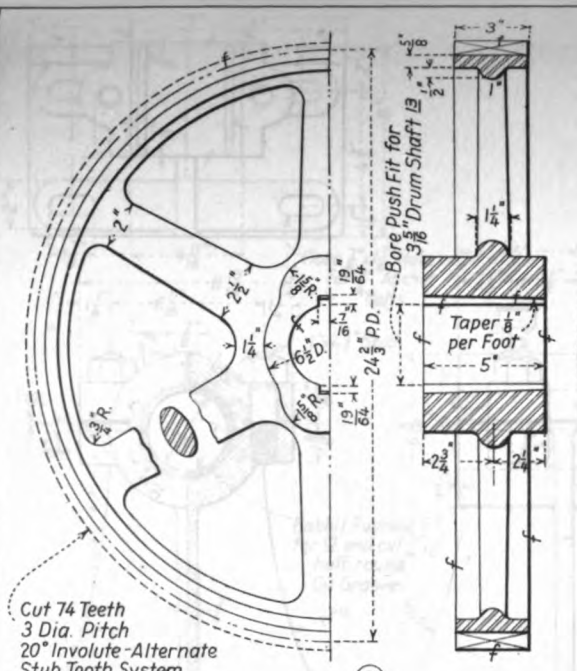
DRAWN: B.H.S. SUBMITTED: C.W.Day
TRACED: C.B.G.-J.J.S. RECOMMENDED: J.K.Savage
CHECKED: E.B.H.-E.N.V. APPROVED: A.J.Walter

23493 | DENVER, COLO., AUG. 15, 1928 SHEET 1 OF 4 | 40-D-447

SPECIFICATIONS NO. 481

DRAWING NO. 1

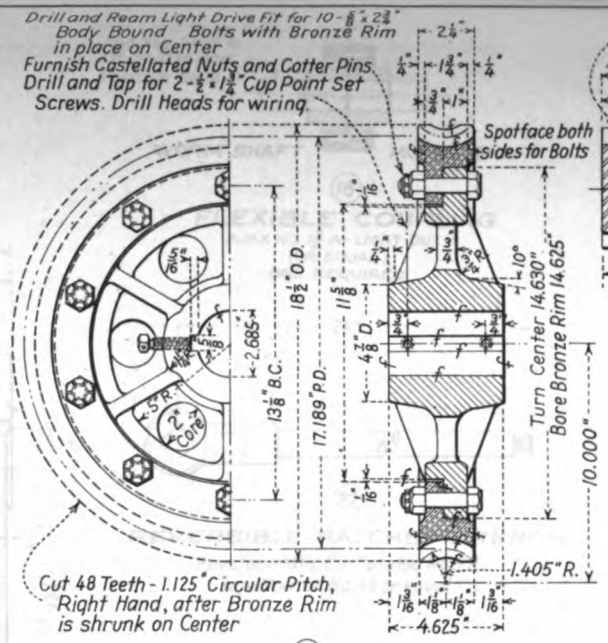

THRUST COLLAR
BRONZE - TWO REQ'D.
.187"
Grind
3
COVER PLATE
SEMISTEEL - ONE REQ'D.
Drill
2
THRUST COLLAR
STEEL - TWO REQ'D.
.125"
Grind
4
Cut 1/4" x 1/8" Half Round Oil Grooves.
Drill and Ream for 1" x 1/8" Dowels.
Drill and Spot-face 6- 7/8" Holes for Anchor Bolts
Tap for 3/8" x 1" Bronze Headless Set Screw. Peen into Slot.
24"
SECTION B-B
HALF PLAN
Drill, Spotface and Tap for 4 - 7/8" x 4 1/4" Studs
Cut 1/4" x 1/8" Half Round Oil Grooves.
HALF PLAN
TOP OF HOUSING REMOVED
Drill 2- 15/32" Holes
GLAND
BRONZE - TWO REQ'D.
Finish all over
SHIM
SHEET STEEL - ONE REQ'D.
7-Sheets @.005"
9-Sheets @.010"
Remove Burrs
Drill and Spotface other side 8- 15/32" Holes
Bore Light Press Fit for Roller Bearing Cup
3/8" x 2" Tap Bolt
7/16" x 3/4" Studs with Bronze Hex. Nuts
BEARING CARRIER
SEMISTEEL - TWO REQUIRED
Formed Rings Cut Open
PACKING
GARLOCK No. 99
OR EQUAL
SIX RINGS REQ'D
Inspection and Oil Opening
Tap for 7/16" x 1" Tap Bolt
3/4" Std. Forged Steel Eye Bolt
5/16" Hex Nut
7/8" x 3" Stud
Turn 5/16" D.
2" Plain Grease Cup, 3/8" Shank
1" Oil Hole
6.250" Bore
4.500"
Bore Running Fit for 13
Bore Light Drive Fit for Bushing
Drill 3/8" deep for 3/8" x 2 1/2" Dowels. Drive in Tight.
2" Plain Grease Cup, 3/8" Shank, Ell and Nipple, 1/4" Oil Hole
Drill and Spot-face 8- 3/4" Holes for 5/8" x 2 1/2" Bolts.
Bronze Bushing
1/4" Pipe Tap for Powell Oil Gage or equal. Provide 1/4" Brass Pipe Plug opposite side.
8.750"
8.750"
8 1/2" D
7 3/8" B.C.
1 1/4" x 1 3/8" Tap Bolts
8 7/16" x 1 1/8" Tap Bolts
1/4" Pipe Taps for Brass Plugs both sides for Oil Drain.
Bronze Bushing
Provide hard Paper Gasket - Shellacked.
Cast U.S.R. in Sharp Face Gothic Letters - Both Sides
5/8" x 1" Tap Bolt
10.000"
2'-6"
GEAR HOUSING
SEMISTEEL - ONE REQUIRED
HALF ELEV.
HALF SEC. A-A
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
DENVER OFFICE
RADIAL GATE HOIST
GEAR HOUSING - BEARING CARRIER
CAPACITY 7,000 POUNDS
DRAWN: B.H.S.
TRACED: C.B.G.
CHECKED: E.B.H.-E.N.V.
SUBMITTED: C.W. Day
RECOMMENDED: J.K. Savage
APPROVED: O.T. Meeter
SPECIFICATIONS NO. 481
DRAWING NO.



(9)

SPUR GEAR

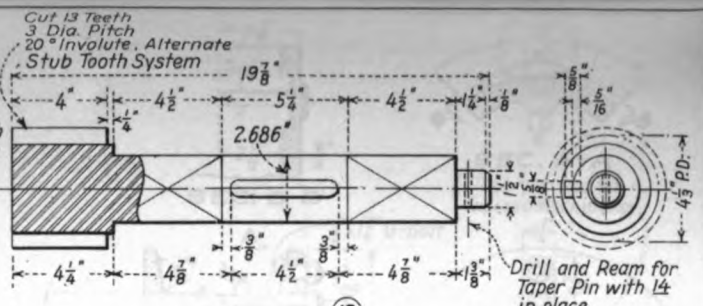
CAST STEEL — ONE REQUIRED



(10)

WORM GEAR

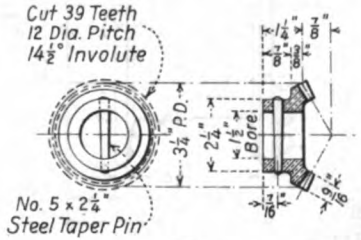
BRONZE RIM — SEMISTEEL CENTER
ONE REQUIRED



(12)

SPUR PINION AND SHAFT

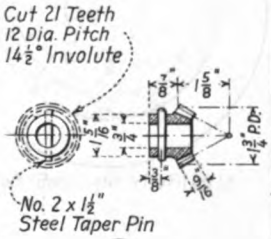
FORGED STEEL — ONE REQUIRED
Finish all over



(14)

BEVEL GEAR

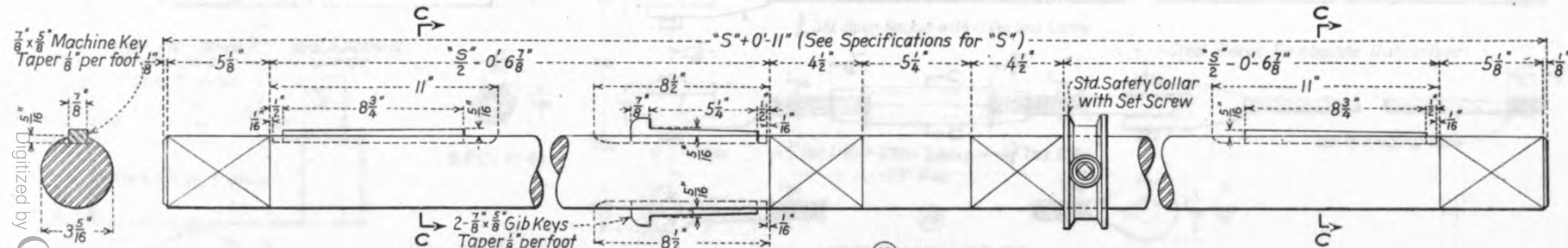
BRONZE — ONE REQUIRED
Finish all over



(15)

BEVEL PINION

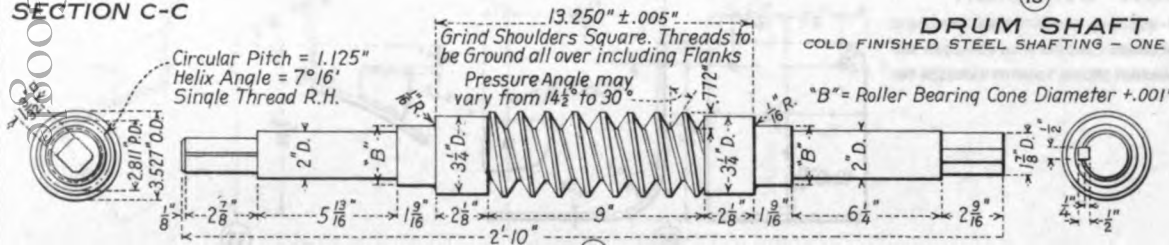
BRONZE OR STEEL
ONE REQUIRED
Finish all over



(13)

DRUM SHAFT

COLD FINISHED STEEL SHAFTING — ONE REQUIRED



(11)

ALLOY STEEL — ONE REQUIRED — COMPLETE WITH STEEL KEY — FINISH - HEAT TREAT - CASE HARDEN - GRIND DIAMETERS

WORM

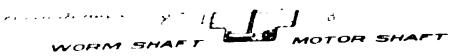
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
DENVER OFFICE

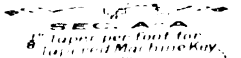
RADIAL GATE HOIST
GEARS AND SHAFTS
CAPACITY 7,000 POUNDS

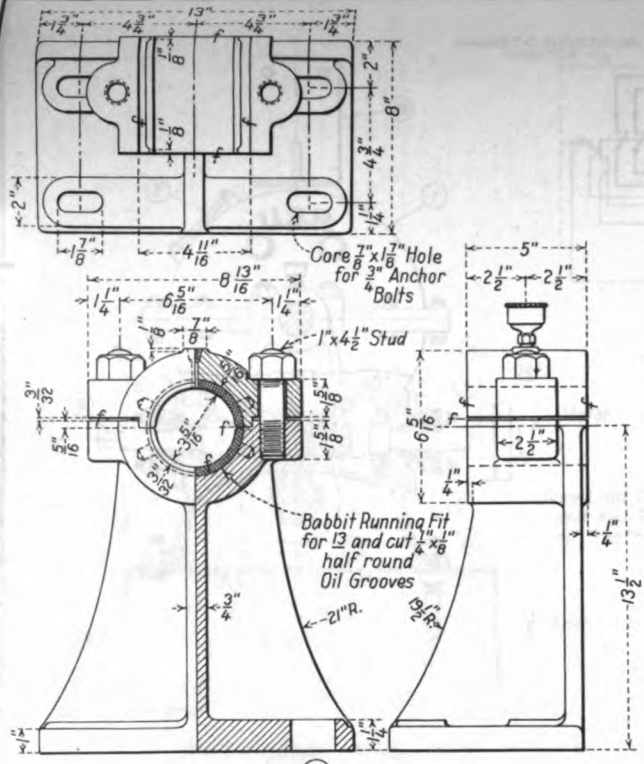
DRAWN: B.H.S.	SUBMITTED: C.W. Day		
TRACED: R.McC. J.J.S.	RECOMMENDED: J.L. Savage		
CHECKED: E.B.H. E.N.V.	APPROVED: J.S. Walker		
23495	DENVER, COLO., AUG. 15, 1928 SHEET 3 OF 4	40-D-449	

SPECIFICATIONS NO. 481

DRAWING NO. 15



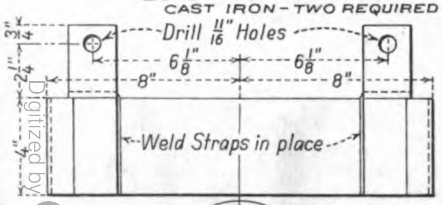


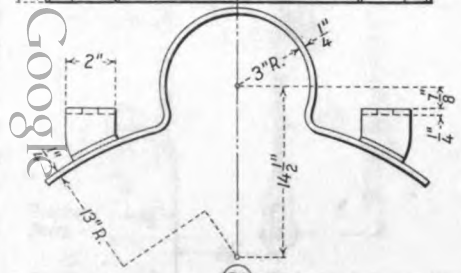


(17)

DRUM SHAFT BEARING

CAST IRON - TWO REQUIRED

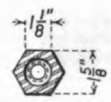




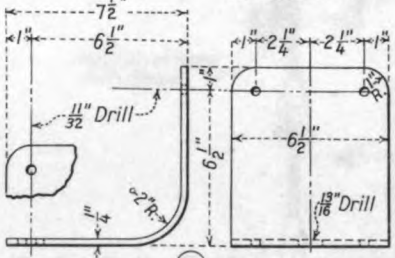
(21)

GEAR GUARD

MILD STEEL - ONE REQUIRED



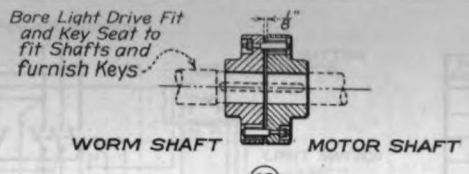
SEC. C-C



(20)

LIMIT SWITCH PLATE

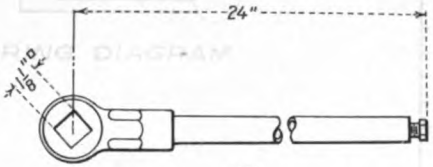
STEEL - ONE REQUIRED



(16)

FLEXIBLE COUPLING

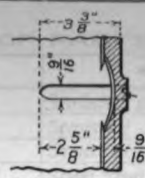
AJAX NO. 1 3/4 A-LIGHT DUTY
(OR EQUAL)
ONE REQUIRED

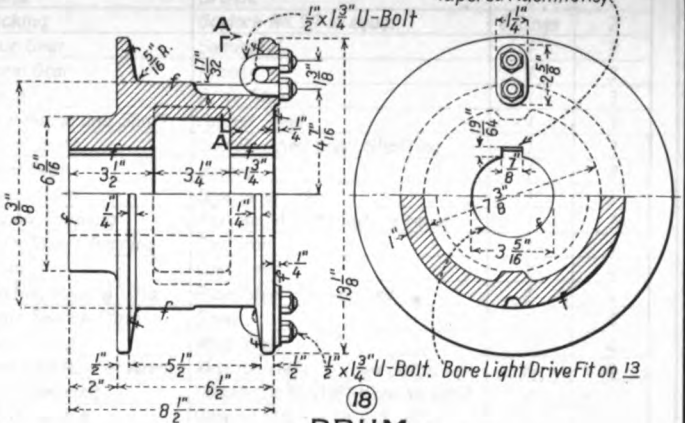


(22)

REVERSIBLE RATCHET WRENCH

Keystone Mfg. Co. Catalog No. 28
Tap Wrench No. 66 or equal

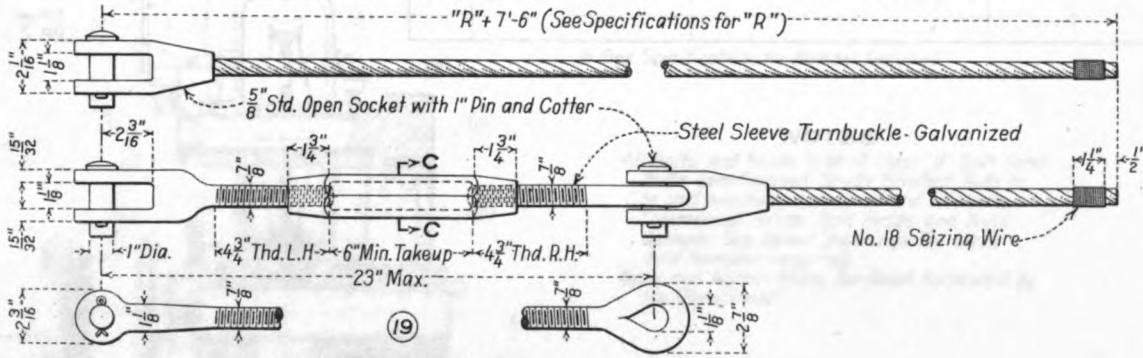




(18)

DRUM

CAST IRON - TWO REQUIRED



(19)

HOISTING ROPE

5/8" DIAMETER-6 STRANDS-19 WIRES-PLOW STEEL GALV.
ONE REQUIRED WITH SPECIAL TURNBUCKLE AS SHOWN
ONE REQUIRED WITHOUT SPECIAL TURNBUCKLE AS SHOWN

DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
DENVER OFFICE

RADIAL GATE HOIST

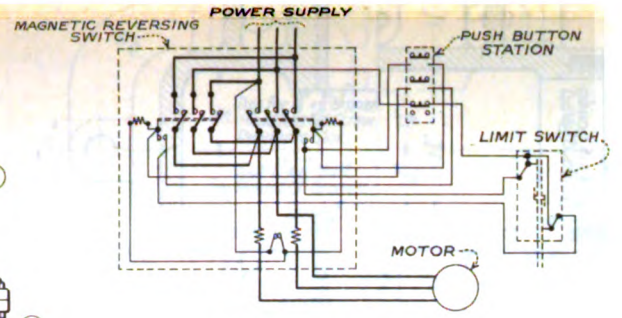
DRUM-DRUM SHAFT BEARING-GEAR GUARD

CAPACITY 7,000 POUNDS

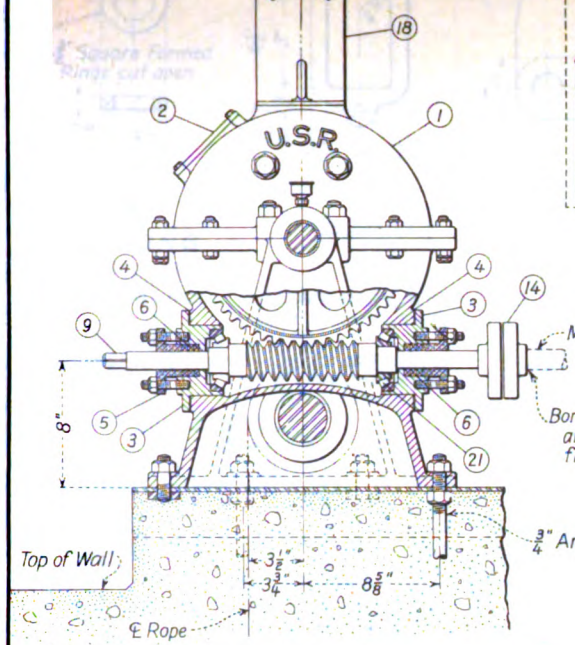
DRAWN: B.H.S.	SUBMITTED: C.W. Day		
TRACED: A.A.A.	RECOMMENDED: J.L. Savage		
CHECKED: E.B.H. ENV.	APPROVED: O.S. Stratton		
23496	DENVER, COLO., AUG. 15, 1928 SHEET 4 OF 4	40-D-450	

SPECIFICATIONS NO. 481

DRAWING NO. 1

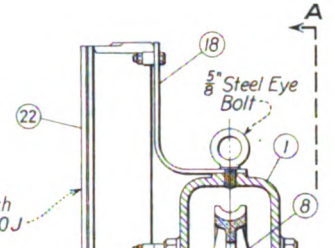


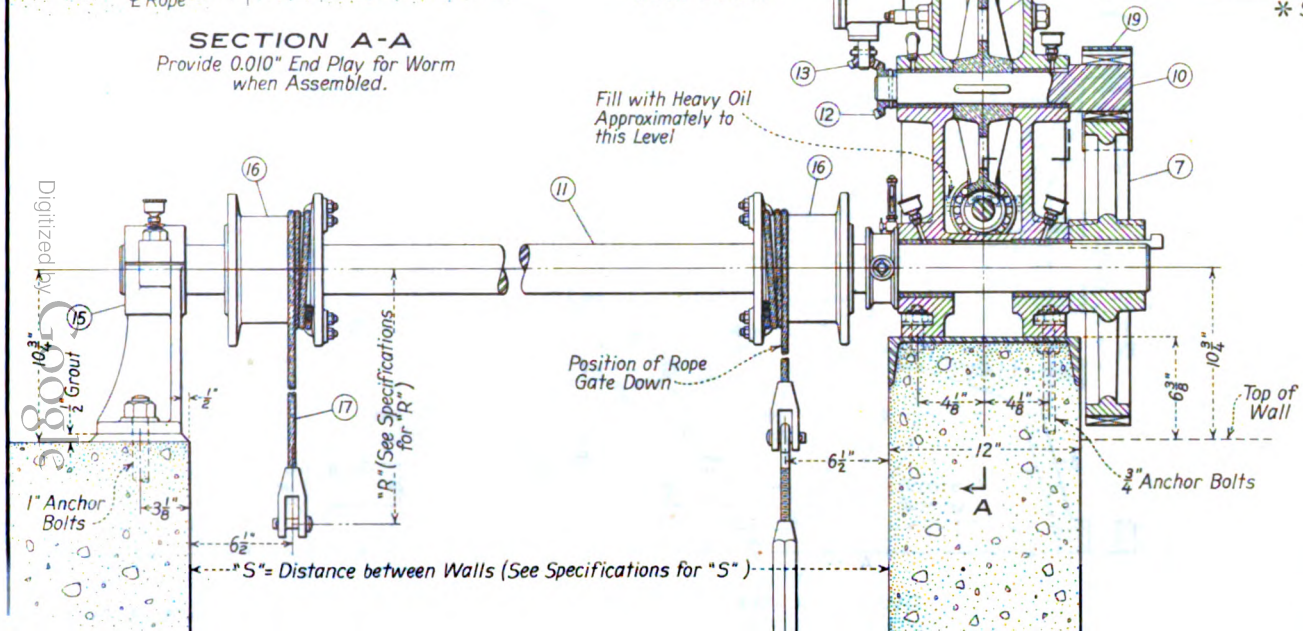
WIRING DIAGRAM



SECTION A-A

Provide 0.010" End Play for Worm when Assembled.





LIST OF PARTS - ONE HOIST

PART NUMBER	DESCRIPTION	MATERIAL	NUMBER REQUIRED	SHEET NUMBER
1	Gear Housing	Semisteel and Bronze	1	2
2	Cover Plate	Semisteel	1	2
3	Bearing Carrier	Semisteel	2	2
4	Shim	Sheet Steel	1	2
5	Gland	Bronze	2	2
6	Packing	Garlock No. 99 or equal	6 Rings	2
7	Spur Gear	Semisteel	1	3
8	Worm Gear	Bronze	1	3
9	Worm	Alloy Steel	1	3
10	Spur Pinion and Shaft	Forged Steel	1	3
11	Drum Shaft	Cold Finished Steel Shafting	1	3
12	Bevel Gear	Bronze	1	3
13	Bevel Pinion	Bronze or Steel	1	3
14	Flexible Coupling	Ajax No. 1A Light Duty or equal	1	1
15	Drum Shaft Bearing	Cast Iron	1	4
16	Drum	Cast Iron	2	4
17	Hoisting Rope 7/8" Dia.	Plow Steel - Galvanized	2	4
18	Limit Switch Plate	Steel	1	4
19	Gear Guard	Mild Steel	1	4
20	Reversible Ratchet Wrench	Keystone Mfg. Co. (See Detail)	*	4
21	Roller Bearing	Timken-Cup No. 53387-Cone No. 53162	2	1
22	Limit Switch	General Electric Co. L.S.-80J	1	1

* See Specifications for Number Required

NOTES

All Bolts and Studs to be of Class "B" Bolt Steel. Bolts semifinished. Studs finished. Nuts to be cold punched, chamfered and trimmed, Commercial Grade. Bolt Heads and Nuts Hexagon. See Detail Drawings for Sizes and Number required.

Base and Anchor Bolts for Hoist furnished by the Government.

DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
DENVER OFFICE

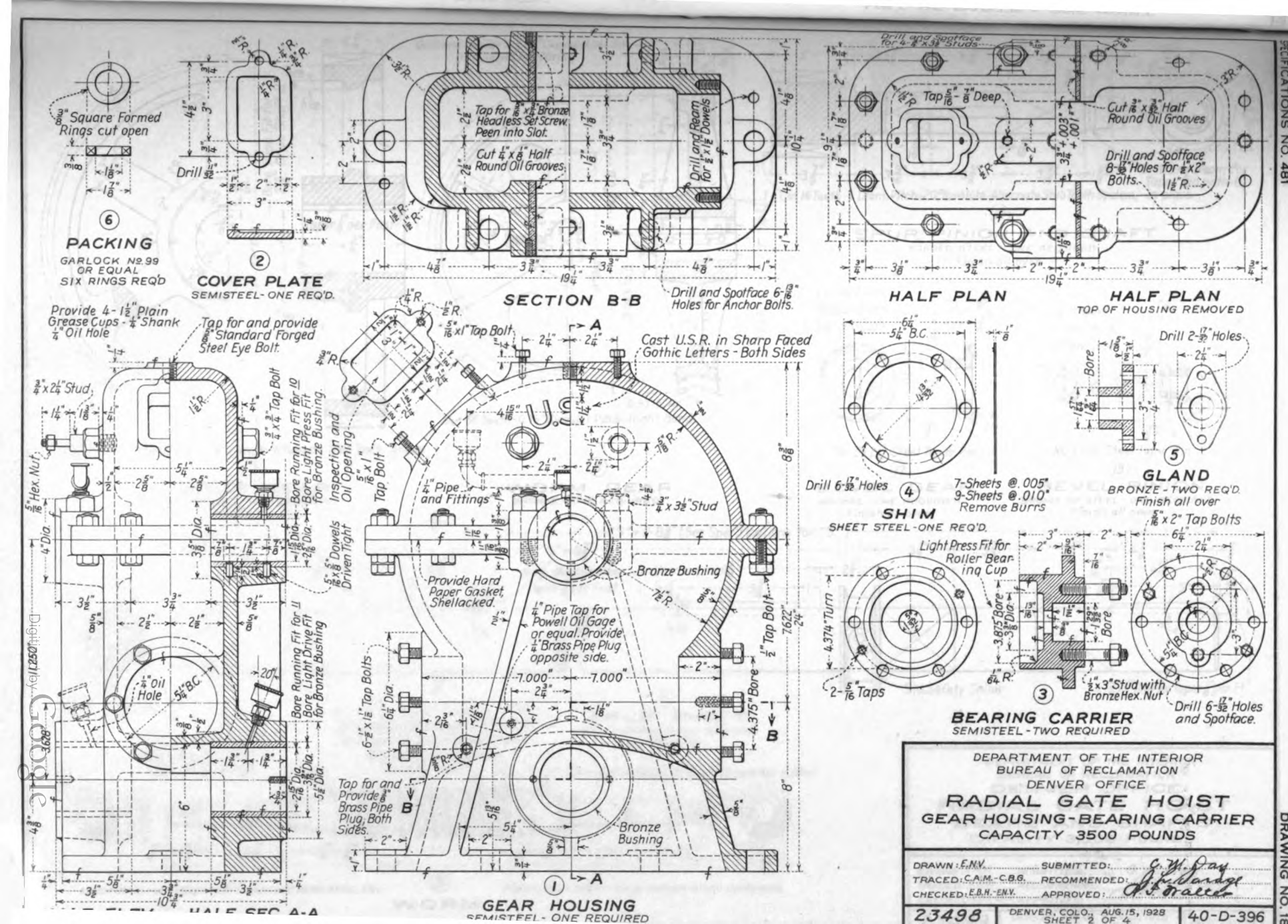
RADIAL GATE HOIST

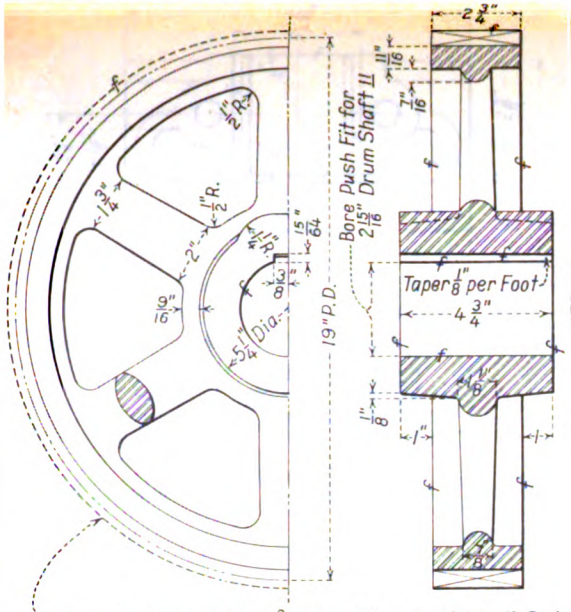
GENERAL ASSEMBLY - LIST OF PARTS

CAPACITY 3,500 POUNDS

DRAWN: B.H.S.-E.N.V. SUBMITTED: C. M. Day
TRACED: J.J.S. RECOMMENDED: [illegible]
CHECKED: E.B.H.-E.N.V. APPROVED: [illegible]

23497 | DENVER, COLO., AUG. 15, 1928 SHEET 1 OF 4 | 40-D-395

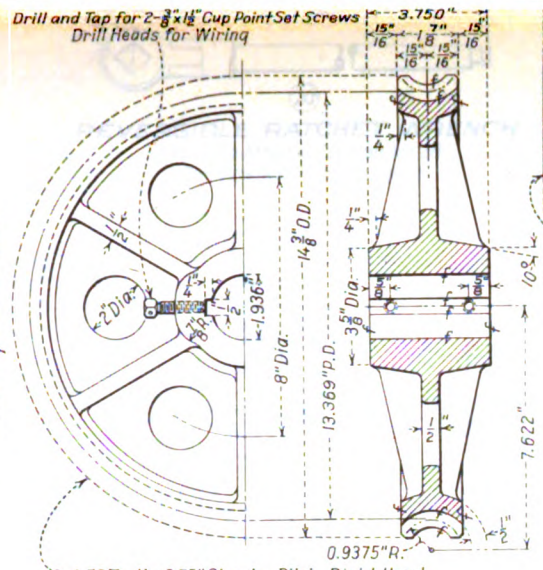

6 PACKING
GARLOCK NO. 99 OR EQUAL
SIX RINGS REQ'D
.080" Square Formed Rings cut open
2 COVER PLATE
SEMISTEEL - ONE REQ'D.
Drill 11/32"
SECTION B-B
Tap for 1/2" x 1" Bronze Headless Set Screw. Peen into Slot.
Cut 1/4" x 1/8" Half Round Oil Grooves.
Drill and Ream for 1/2" x 1/2" Dowels
Drill and Spotface 6-13/16" Holes for Anchor Bolts.
Drill and Spotface for 4-1" x 3 1/2" Studs.
Tap 5/16" - 7/8" Deep.
Cut 1/8" x 3/32" Half Round Oil Grooves
Drill and Spotface 8-17/32" Holes for 1/2" x 2" Bolts.
HALF PLAN
HALF PLAN
TOP OF HOUSING REMOVED
Provide 4-1 1/2" Plain Grease Cups - 1/4" Shank
1/4" Oil Hole
Tap for and provide 3/8" Standard Forged Steel Eye Bolt.
3/4" x 2 1/4" Stud
Hex. Nut
Inspection and Oil Opening
Bore Running Fit for 10
Bore Light Press Fit for Bronze Bushing.
5/16" x 5/8" Dowels Driven Tight
Bore Running Fit for 11
Bore Light Drive Fit for Bronze Bushing
1/4" Oil Hole
5 1/4" B.C.
20°
HALF SEC. A-A
Cast U.S.R. in Sharp Faced Gothic Letters - Both Sides
5/16" x 1" Tap Bolt
1/4" Pipe and Fittings
3/4" x 3 1/2" Stud
Provide Hard Paper Gasket, Shellacked.
Bronze Bushing
1/4" Pipe Tap for Powell Oil Gage or equal. Provide 1" Brass Pipe Plug opposite side.
1/2" Tap Bolt
4.375" Bore
6-1/2" x 1 1/2" Tap Bolts
6 1/4" Dia.
Tap for and Provide 3/8" Brass Pipe Plug, Both Sides.
Bronze Bushing
1 GEAR HOUSING
SEMISTEEL - ONE REQUIRED
6 1/4" B.C.
Drill 6-17/32" Holes
4 SHIM
SHEET STEEL - ONE REQ'D.
7-Sheets @ .005"
9-Sheets @ .010"
Remove Burrs
Drill 2-17/32" Holes
5 GLAND
BRONZE - TWO REQ'D.
Finish all over
5/16" x 2" Tap Bolts
Light Press Fit for Roller Bearing Cup
4.374" Turn
3.875" Bore
2-5/16" Taps
1/2" x 3" Stud with Bronze Hex. Nut
Drill 6-17/32" Holes and Spotface.
3 BEARING CARRIER
SEMISTEEL - TWO REQUIRED
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
DENVER OFFICE
RADIAL GATE HOIST
GEAR HOUSING - BEARING CARRIER
CAPACITY 3500 POUNDS
DRAWN: F.N.V.
TRACED: C.A.M. - C.B.G.
CHECKED: E.B.H. - F.N.V.
SUBMITTED: G. W. Gray
RECOMMENDED: J. L. Savage
APPROVED: A. P. Kaiser
23498
DENVER, COLO. AUG. 15, 1928
SHEET 2 OF 4
40-D-396
SPECIFICATIONS NO. 481
DRAWING NO. 18



Cut 76 Teeth - 4 Diam. Pitch - 20° Involute - Alternate Stub Tooth System

(7) SPUR GEAR

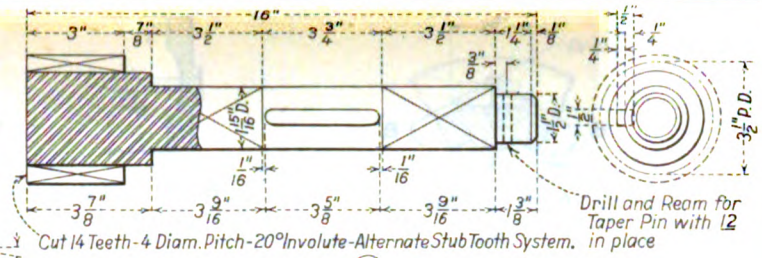
SEMISTEEL - ONE REQUIRED



Cut 56 Teeth - 0.75" Circular Pitch - Right Hand

(8) WORM GEAR

BRONZE - ONE REQUIRED

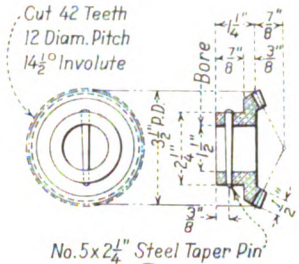


Cut 14 Teeth - 4 Diam. Pitch - 20° Involute - Alternate Stub Tooth System.

(10) SPUR PINION AND SHAFT

FORGED STEEL - ONE REQUIRED

Finish all over

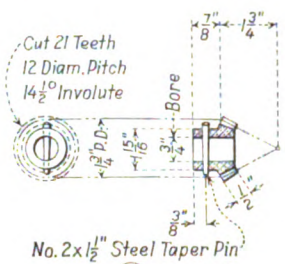


No. 5 x 2 1/4" Steel Taper Pin

(12) BEVEL GEAR

BRONZE - ONE REQUIRED

Finish all over

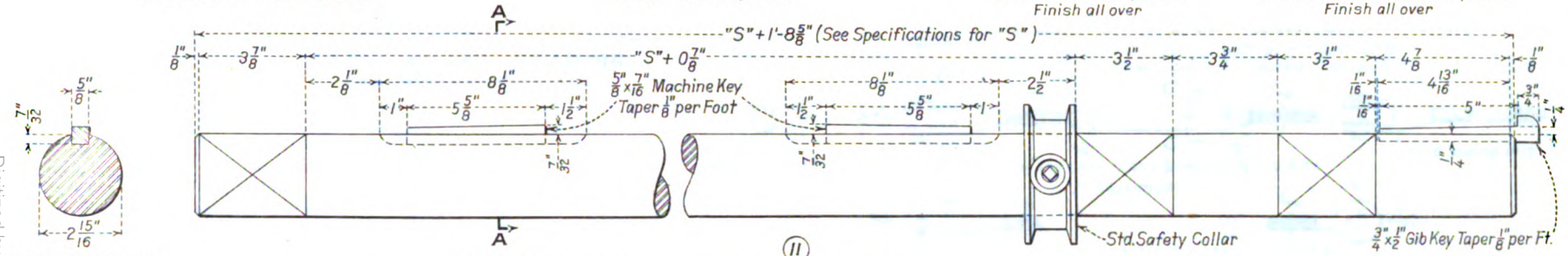


No. 2 x 1 1/2" Steel Taper Pin

(13) BEVEL PINION

BRONZE OR STEEL - ONE REQUIRED

Finish all over

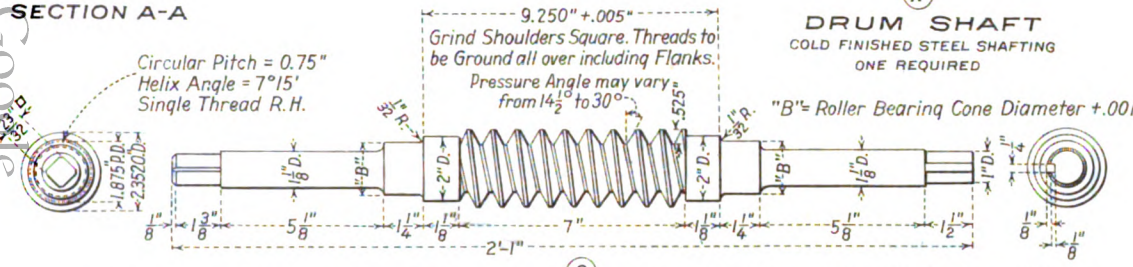


SECTION A-A

(11) DRUM SHAFT

COLD FINISHED STEEL SHAFTING

ONE REQUIRED



ALLOY STEEL - ONE REQUIRED - COMPLETE WITH STEEL KEY

(9) WORM

FINISH - HEAT TREAT - CASE HARDEN - GRIND DIAMETERS

DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
DENVER OFFICE

RADIAL GATE HOIST GEARS AND SHAFTS

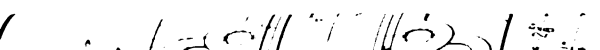
CAPACITY 3,500 POUNDS

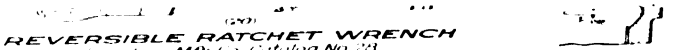
DRAWN: E.N.V.	SUBMITTED: C. W. Dorg	
TRACED: A.A.A.	RECOMMENDED: H. W. Dana	
CHECKED: E.B.H. E.N.V.	APPROVED: A. P. Davis	

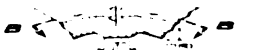
23499	DENVER, COLO., AUG. 15, 1928 SHEET 3 OF 4	40-D-397

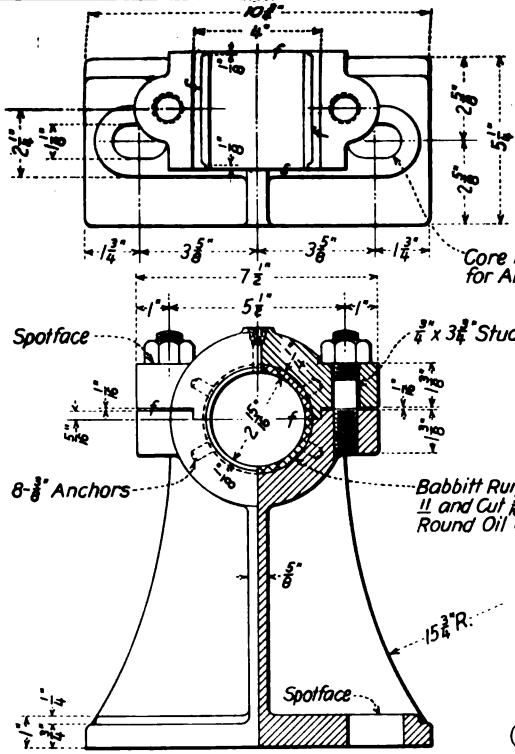
SPECIFICATIONS NO. 481

DRAWING NO. 19



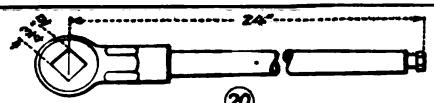






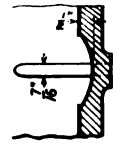
(15)

DRUM SHAFT BEARING
CAST IRON - ONE REQUIRED.

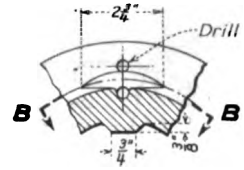


(20)

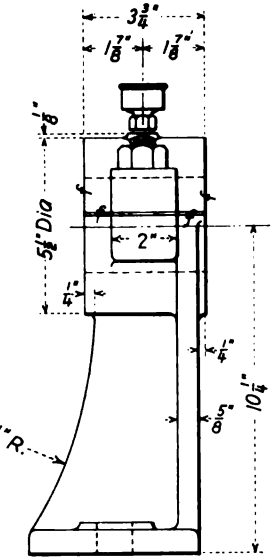
REVERSIBLE RATCHET WRENCH
Keystone Mfg. Co. Catalog No. 28
Tap Wrench No. 66 or equal

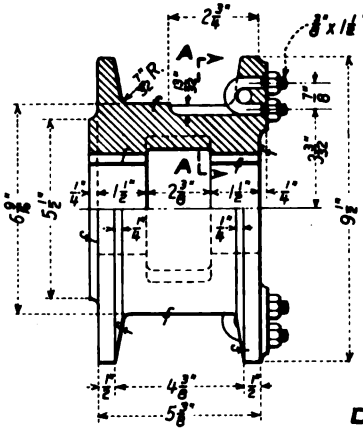


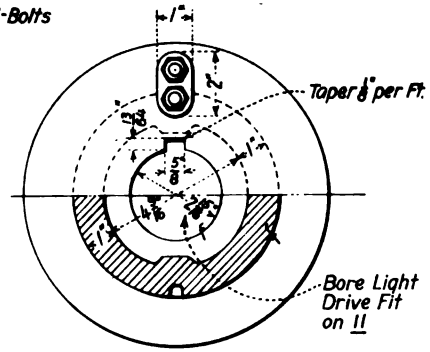
SEC. B-B



SEC. A-A

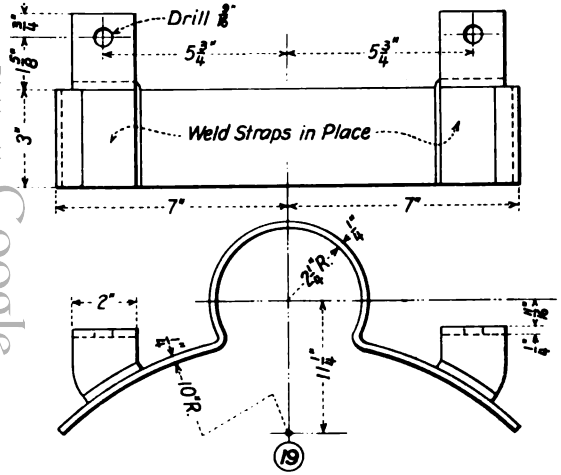






(16)

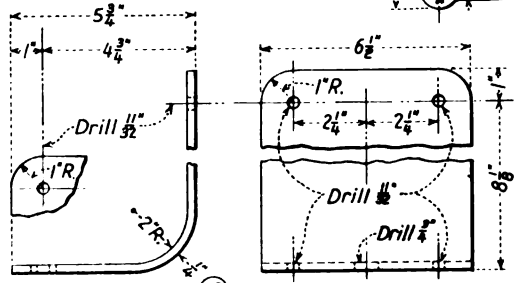
DRUM
CAST IRON - TWO REQUIRED



(19)

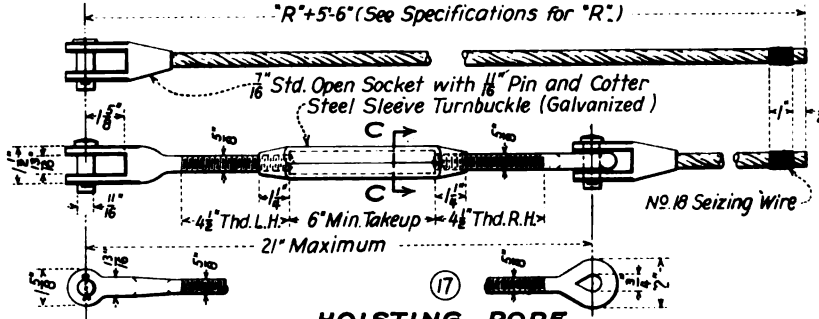
GEAR GUARD
MILD STEEL - ONE REQUIRED

SEC. C-C



(18)

LIMIT SWITCH PLATE
STEEL - ONE REQUIRED



(17)

HOISTING ROPE
7/16" DIAMETER - 6 STRANDS - 19 WIRES - PLOW STEEL - GALV.
ONE REQUIRED WITH SPECIAL TURNBUCKLE AS SHOWN
ONE REQ'D. WITHOUT SPECIAL TURNBUCKLE AS SHOWN

DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
DENVER OFFICE

RADIAL GATE HOIST
DRUM-DRUM-SHAFT BEARING-GEAR GUARD
CAPACITY 3,500 POUNDS

DRAWN: E.N.V.	SUBMITTED:	C.W. Dyer
TRACED: C.B.G.	RECOMMENDED:	Asst. Engr.
CHECKED: E.B.H. E.N.V.	APPROVED:	A.P. Stratton

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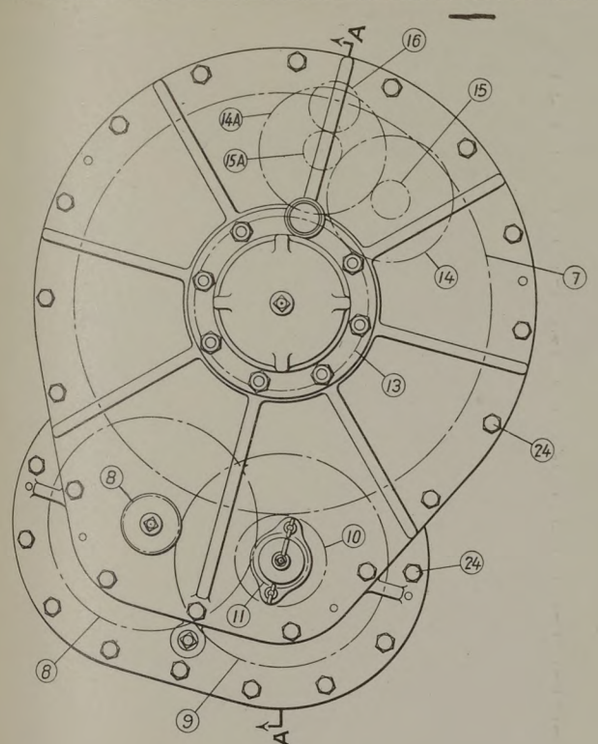

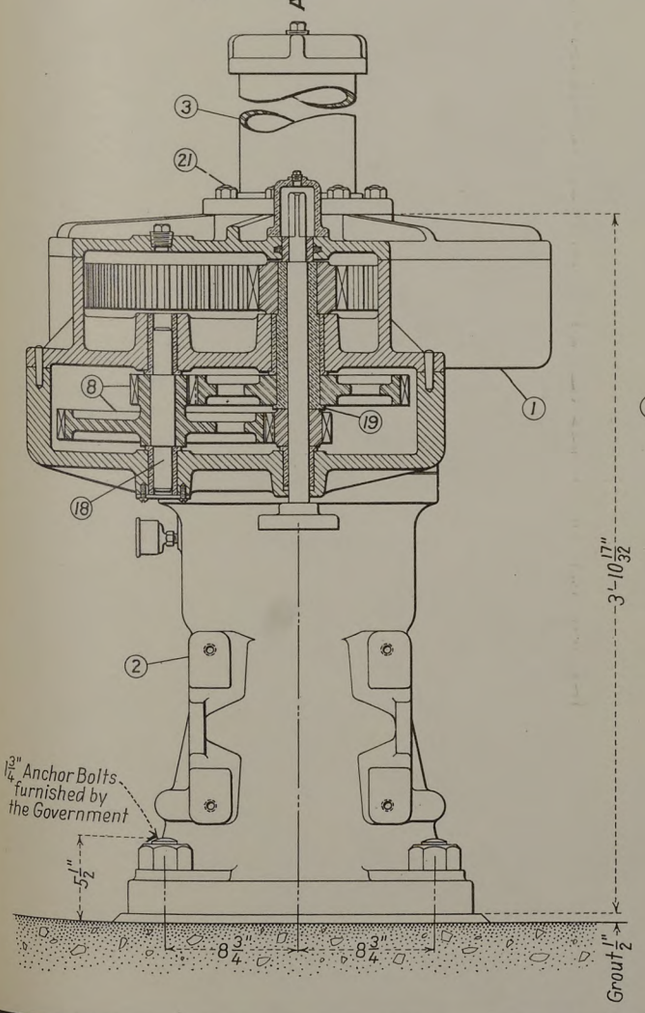

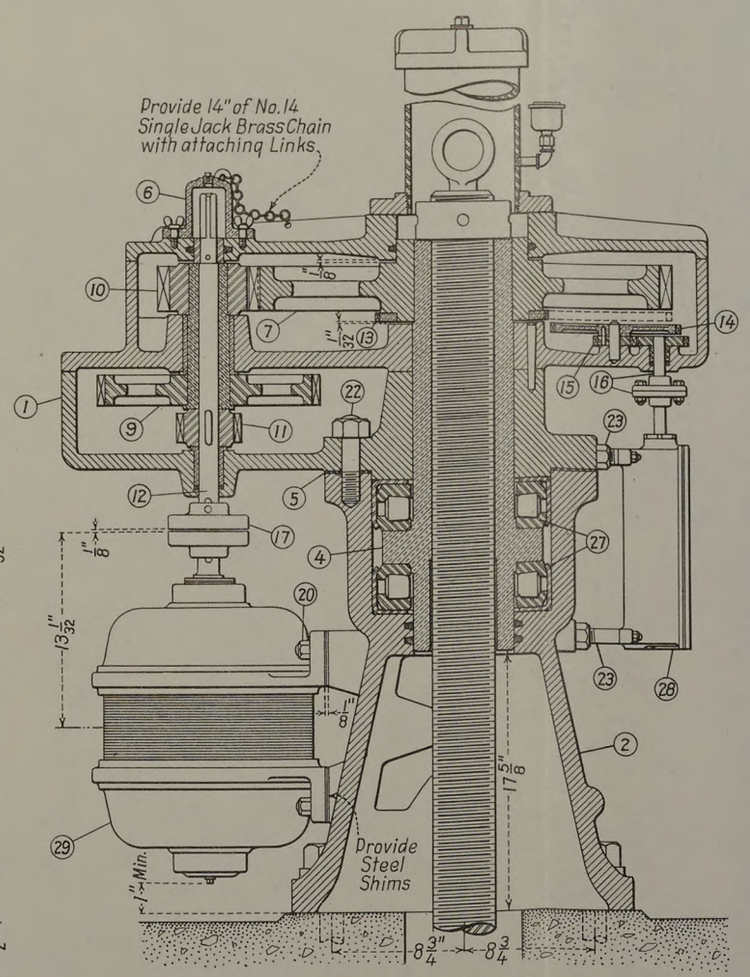

SECTION A-A

NOTES

MOTOR:- Alternating Current-3 Phase-60 Cycle Induction Type K.T.R. Frame 952- Minimum Starting Torque 98 Lbs. Minimum Full Load Torque 39 Lbs., 15 min. rating 900 R.P.M. Synchronous Speed-Totally enclosed Frame-Ball Bearing (General Electric Co.)

ROLLER BEARING ADJUSTMENT:- With Lifting Nut 4 and Roller Bearing 27 Assembled in Pedestal 2 Mount lower half of Case 1 and apply an even wrench pull of about 5 Lbs. on the Nut of Studs 22 bringing the Case to a snug even fit on the Roller Bearing- With a thickness Gage measure the space between the Case and and Rim of the Pedestal to which dimension add .010 inches which will be the required thickness for Shim 5 to afford proper working clearance for the Roller Bearings.

Casting Dimensions are Minimum, add required Draft.

Provide suitable Felt Packing where required.

LIST OF PARTS - ONE HOIST

PART NUMBER	DESCRIPTION	MATERIAL	NUMBER REQUIRED	SHEET NUMBER
1	Gear Case	Semisteel	1	2
2	Pedestal	Semisteel	1	2
3	Stem Guard	Steel Pipe	1	2
4	Lifting Nut	Grade 6 Bronze	1	2
5	Shim	Sheet Steel	1	2
6	Motor Shaft Cap	Brass	1	2
7	Stem Gear	Semisteel	1	3
8	Cluster Gear and Pinion	Cast Steel	1	3
9	Spur Gear	Cast Steel	1	3
10	Stem Pinion	Cast Steel	1	3
11	Motor Pinion	Forged Steel	1	3
12	Motor Pinion Shaft	C.F. Steel Shafting	1	3
13	L.S. Drive Gear	Bronze	1	3
14	L.S. Gear	Bronze	1	3
14-A	L.S. Gear	Bronze	1	3
15	L.S. Pinion	Steel	1	3
15-A	L.S. Pinion	Steel	1	3
16	L.S. Pinion-Coupling & Shaft	Steel	1	3
17	Flexible Coupling	Ajax No. 1 1/4 A-Light Duty	1	3
18	Cluster Gear Shaft	C.F. Steel Shafting	1	3
19	Stem Pinion Shaft	Rolled Bronze	1	3
20	5/8" x 3" Stud with Hex. Nut	Bolt Steel - Class "B"	4	3
21	3/4" x 3 1/4" Stud with Hex. Nut	Bolt Steel - Class "B"	8	3
22	1 1/4" x 5 7/8" Stud with Hex. Nut	Bolt Steel - Class "B"	11	3
23	Limit Switch Stud	Bolt Steel - Class "C"	4	3
24	5/8" x 2 1/4" Hex. Head Tap Bolt	Bolt Steel - Class "C"	30	2
25	5/8" x 2 1/2" Flat Head Cap Screw	Bolt Steel - Class "C"	2	2
26	Reversible Ratchet Wrench	See Detail	*	3
27	Timken Roller Bearings	Number T-702	2	1
28	Limit Switch - L.S. 80 J	General Electric Co.	1	1
29	Motor (See Notes-Sheet 1 of 3)	General Electric Co.	1	1

* See Specifications for number required

STEM DATA AND CAPACITY TABLE

STEM DIAMETER	STANDARD ACME THREADS TWO PER INCH	CAPACITY POUNDS STARTING	MAX. UNSUPPORTED STEM LENGTH fc = 15,000		CAPACITY POUNDS RUNNING
			THREADS	BODY	
3 1/2"	Single	74,000	4'-9"	9'-2"	40,200
3 1/2"	Double, L=1.000 P=0.500	61,300	6'-7"	11'-2"	33,800
3 3/4"	Single	69,800	7'-6"	11'-11"	38,100
3 3/4"	Double, L=1.000 P=0.500	58,400	9'-3"	14'-1"	32,400
4 "	Single	66,000	10'-2"	14'-10"	36,200
4 "	Double, L=1.000 P=0.500	55,700	12'-1"	17'-2"	31,000
4 1/4"	Single	62,700	12'-11"	17'-11"	34,600
4 1/4"	Double, L=1.000 P=0.500	53,400	15'-0"	20'-6"	29,900

DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
DENVER OFFICE

65:1 GEARED GATE HOIST
ASSEMBLY AND LIST OF PARTS

DRAWN: B.H.S. SUBMITTED: C.W. Day
TRACED: A.A.A. RECOMMENDED: J.L. Savage
CHECKED: F.B.H-M.G.D. APPROVED: A.B. Fraser

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PLAN - COVER

SECTION E-E

PLAN-COVER REMOVED

SEC. C-C

SEC. D-D

SECTION A-A

SECTION B-B

SECTION F-F

FELT GROOVE DETAIL

① GEAR CASE
SEMISTEEL – ONE REQUIRED

NOTES
Bronze Bushings to be Tight Press Fit.
Perform Line Borings with all Sections of GEAR CASE otherwise machined, doweled and bolted together.
Cut suitable Oil Grooves in Bushings and where otherwise required

② PEDESTAL
SEMISTEEL – ONE REQUIRED

Check Dimensions of Pads for Mounting Motor with the Motor used

③ STEM GUARD
STEEL PIPE – ONE REQUIRED

④ LIFTING NUT
PHOSPHOR BRONZE – ONE REQUIRED
Finish all over

⑤ SHIM
SHEET STEEL – ONE REQUIRED

⑥ MOTOR SHAFT CAP
BRASS – ONE REQUIRED

DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
DENVER OFFICE

65:1 GEARED GATE HOIST
PEDESTAL-GEAR CASE-STEM GUARD-LIFTING NUT

DRAWN: B.H.S. SUBMITTED: C.W. Day
TRACED: C.A.M. A.A.A RECOMMENDED: J.W. Savage
CHECKED: E.B.H-M.G.D. APPROVED: A.P. Walter

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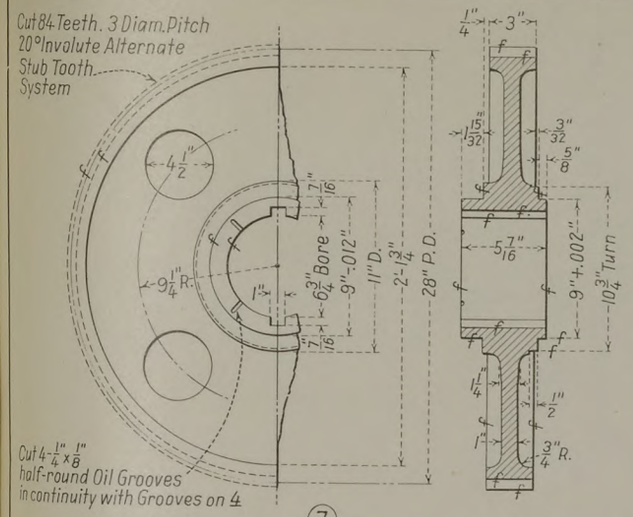
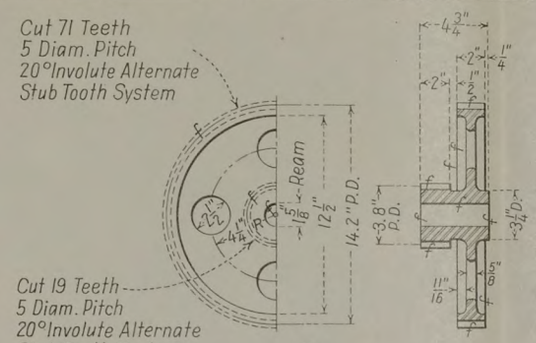


(7)

STEM GEAR

SEMISTEEL – ONE REQUIRED



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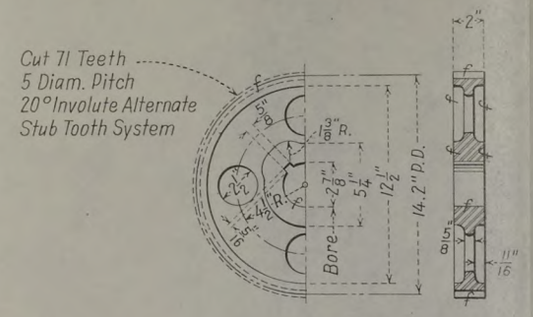
CLUSTER GEAR AND PINION

CAST STEEL – ONE REQUIRED



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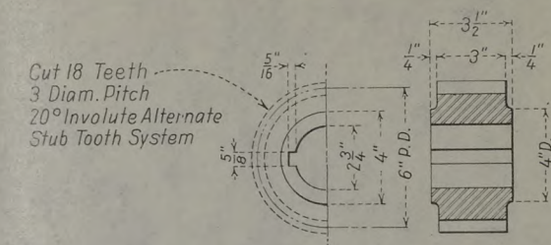
SPUR GEAR

CAST STEEL – ONE REQUIRED



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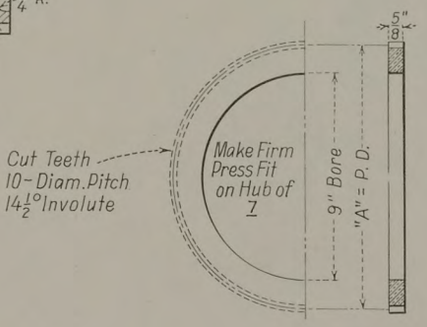
STEM PINION

CAST STEEL – ONE REQUIRED
Finish all over



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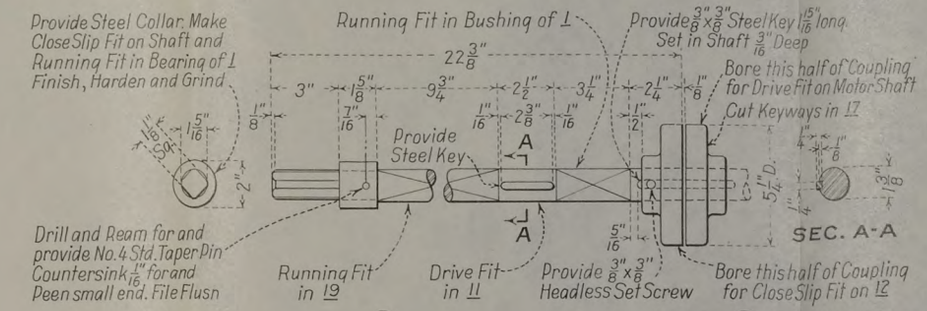
L.S. DRIVE GEAR

BRONZE – ONE REQUIRED
Finish all over



(12)

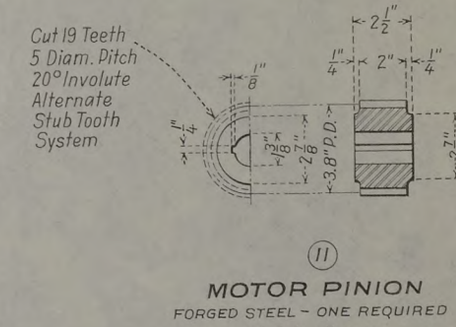
MOTOR PINION SHAFT

COLD FINISHED STEEL SHAFTING – ONE REQUIRED
Finish, Heat Treat, Harden
and Grind Diameters

(17)

FLEXIBLE COUPLING

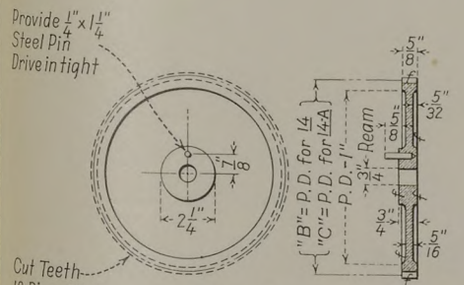
AJAX NO. 1 1/4 A – LIGHT DUTY
ONE REQUIRED



(11)

MOTOR PINION

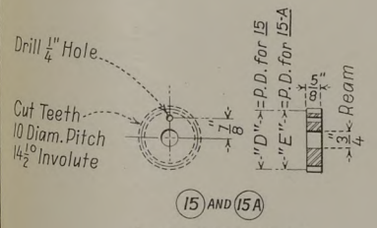
FORGED STEEL – ONE REQUIRED
Finish all over



(14) AND (14A)

L.S. GEAR

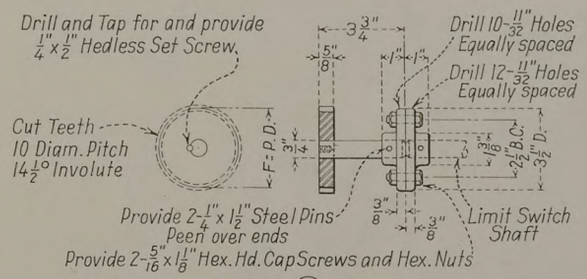
BRONZE – ONE EACH REQUIRED



(15) AND (15A)

L.S. PINION

STEEL – ONE EACH REQUIRED
Finish all over



(16)

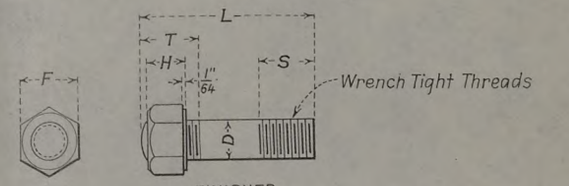
L.S. PINION, COUPLING AND SHAFT

STEEL – ONE REQUIRED
Finish all over

LIMIT SWITCH GEAR TABLE

STEM THREAD	PITCH DIAMETERS IN INCHES					
	GEAR 13	GEAR 14	GEAR 14 A	PINION 15	PINION 15 A	PINION 16
Single	"A" = 11.5	"B" = 8.5	"C" = 8.5	"D" = 2.5	"E" = 2.5	"F" = 3.5
Double	"A" = 11.6	"B" = 8.4	"C" = 7.8	"D" = 3.2	"E" = 3.0	"F" = 3.0

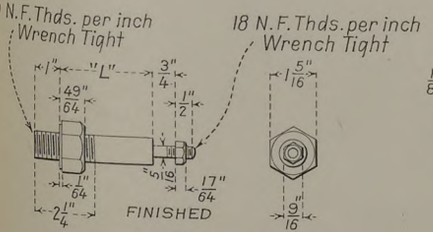
See Specifications for Stem Thread



N = Number of N.F. Threads per inch
All Nuts except as otherwise Specified to be Cold Punched
Chamfered and Trimmed Commercial Grade

STUDS WITH NUTS

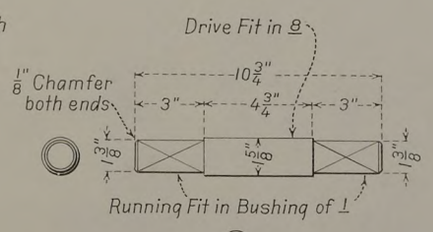
PART NUMBER	NUMBER REQUIRED	DIMENSIONS IN INCHES						N	MATERIAL	USED WITH PARTS
		D	L	S	T	F	H			
20	4	5/8	3	1	1	15/16	35/64	11	Bolt Steel Class "B"	2 and 29
21	8	3/4	3 1/4	1 1/8	1 1/8	1 1/8	21/32	10	Bolt Steel Class "B"	1 and 3
22	11	1 1/4	5 1/8	1 1/8	1 3/4	1 7/8	1 3/32	7	Bolt Steel Class "B"	1 and 2



(23)

LIMIT SWITCH STUD

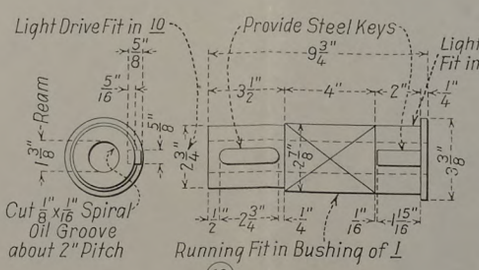
BOLT STEEL – CLASS "C"
TWO REQUIRED - L = 1 7/8"
TWO REQUIRED - L = 3 1/4"



(18)

CLUSTER GEAR SHAFT

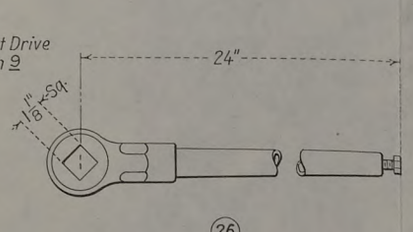
COLD FINISHED STEEL SHAFTING – ONE REQUIRED
Finish, Heat Treat, Harden
and Grind Diameters



(19)

STEM PINION SHAFT

ROLLED BRONZE – ONE REQUIRED
Finish all over



(26)

REVERSIBLE RATCHET WRENCH

Keystone Mfg. Co. Catalog No. 28
Tap Wrench No. 66 or equal

DEPARTMENT OF THE INTERIOR
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DENVER OFFICE

65:1 GEARED GATE HOIST
GEARS - SHAFTS - STUDS

DRAWN: B.H.S. SUBMITTED: C.W. Day
TRACED: A.A.A. RECOMMENDED: John Savage
CHECKED: E.B.H-M.G.D. APPROVED: A. E. Walter

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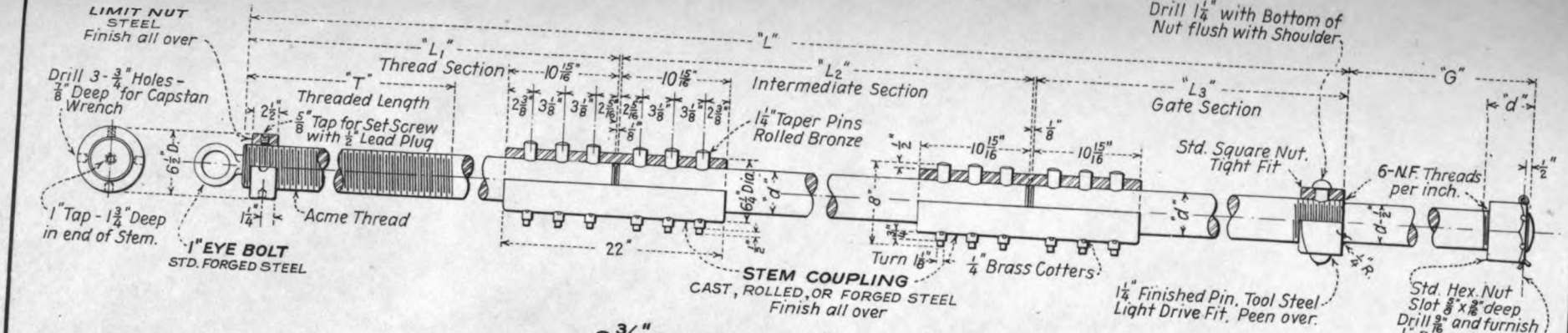
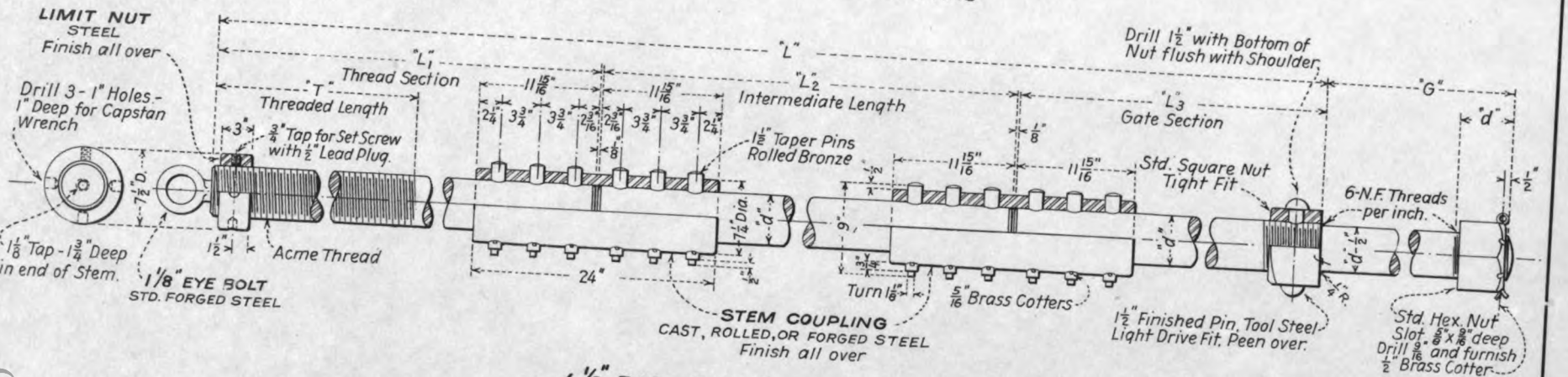


3 3/4" DIA. TO 4 1/4" DIA. GATE STEM

COLD FINISHED STEEL SHAFTING



4 1/2" DIA. TO 5" DIA. GATE STEM

COLD FINISHED STEEL SHAFTING

GENERAL NOTES

Dimensions "L", "L1", "L2", "L3", "G", "T" and "d" are given in Specifications.
Acme Threads to be Right or Left Hand, Single or Double and of the number per inch required by the Specifications.

COUPLING NOTES

Pins - Rolled Bronze. Taper 1/4" per Foot (Dia.) Match Marked.
Couplings - Bore Light Driving Fit for Stem.
Cotter Holes - Drill Snug Fit to Coupling after Assembling in shop.

DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
DENVER OFFICE

3 3/4" TO 5" DIAMETER STEMS CAST IRON GATES

DRAWN	B.H.S.	SUBMITTED	C. W. Day
TRACED	R.McC.	RECOMMENDED	J. L. Savage
CHECKED	E.B.H.	APPROVED	O. J. Walker

DRAWING NO. 481